GENERAL NOTES

- 1. WORK PROVIDED UNDER THIS DIVISION SHALL BE IN CONFORMANCE WITH THE APPLICABLE PORTION OF THE 2007 CBC, CMC, CFC, NEC, 2008 TITLE-24 ENERGY STANDARDS, AND THE CITY OF LIVERMORE AND THE COUNTY REQUIREMENTS.
- 2. PROVIDE U.L. 555 LISTED FIRE DAMPERS AT ALL DUCT PENETRATION THROUGH THE FIRE RATED ASSEMBLIES. PROVIDE UL-555S LISTED COMBINATION FIRE-SMOKE DAMPERS AT ALL THE OCCUPANCY SEPARATION WALLS AND DUCTS PENETRATING RATED CORRIDOR WALLS & SHAFT ASSEMBLIES IN ACCORDANCE WITH 2007 CBC SECTION 713.10/11. PROVIDE PROPER SLEEVE LENGTHS TO MATCH THE WALL DEPTH. MOUNT ACTUATORS, END SWITCHES, HEAT DETECTOR, SMOKE DETCTORS, ETC. ON ACCESSIBLE SIDE OF FSD.
- FIRE AND FIRE—SMOKE DAMPERS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. THE MANUFACTURER'S SPECIFICATIONS SHALL BE MADE AVAILABLE TO THE INSPECTING AUTHORITY.
- 4. ALL PENETRATIONS AT WALLS, CEILINGS, FLOORS, ETC. BY THE DUCTWORK, PIPING, CONDUITS, ETC. SHALL BE SEALED WITH APPROVED U.L. LISTED FIRE STOPPING ASSEMBLIES TO MAINTAIN THE INTEGRITY OF THE FIRE RATING OF THOSE ASSEMBLIES. REFER TO ARCHITECTURAL FLOOR PLANS FOR WALL TYPES & LOCATIONS.
- 5. ALL MECHANICAL EQUIPMENT, DUCTWORK, PIPING, CONDUITS, TANKS, PACKAGED EQUIPMENT, ETC. SHALL BE SEISMICALLY ANCHORED AND BRACED IN ACCORDANCE WITH CBC, SMACNA REQUIREMENTS.
- DIVISION—15 CONTRACTOR SHALL COORDINATE THE POWER REQUIREMENT WITH THE DIVISION—16 WORK, INCLUDING THE VOLTAGE, PHASE, AMP REQUIREMENT, OVERLOAD PROTECTION REQUIREMENT, LOCATION OF STARTERS, DISCONNECTS, INTERLOCK WIRING, POWER WIRING TO FSD'S, WIRING TO SMOKE DETECTORS, ACTUATORS, ETC.
- INSTALL FANS, FIRE DAMPERS & FIRE/SMOKE DAMPERS AND OTHER MECHANICAL COMPONENTS REQUIRING PERIODIC SERVICE & MAINTENANCE ACCESS TO BE COMPLETELY ACCESSIBLE FROM THE CEILING ACCESS PANELS. PROVIDE CODE MANDATED CLEARANCES AT ALL EQUIPMENT & ELECTRICAL PANELS.
- DIVISION—15 CONTRACTOR SHALL COORDINATE THE LOCATION, SIZE & ELEVATION OF THE CONCRETE HOUSEKEEPING PADS WITH THE CONCRETE WORK BASED ON THE ACTUAL MECHANICAL EQUIPMENT PROPOSED FOR THE PROJECT. CONTRACTOR SHALL ALSO COORDINATE THE LOCATION, SIZE OF THE CONCRETE WALL AND SLAB PENETRATIONS WITH THE RESPECTIVE TRADE CONTRACTORS.
- THIS DIVISION CONTRACTOR SHALL PROVIDE COMPLETE COOPERATION IN COMMISSIONING OF ALL THE MECHANICAL, ELECTRICAL, PLUMBING AND CONTROL SYSTEMS BY PROVIDING FULLY QUALIFIED PERSONNEL, EQUIPMENT, TESTING TOOLS, MANPOWER AS NECESSARY TO COMPLETE THE COMMISSIONING, TESTING & DOCUMENTATION TASKS AS NECESSARY LEED V2.2 FUNDAMENTAL COMMISSIONING REQUIREMENT.
- ALL MATERIALS OF CONSTRUCTION INCLUDING SELANTS; WALL, ROOF, & CEILING ELEMENTS; INSULATION; WIRING & CABLES; DEVICES AND EQUIPMENTS; TUBING, ETC. THAT COMES IN CONTACT WITH SUPPLY AIR, OUTSIDE AIR AND RETURN AIR SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND SMOKE DEVELOPED RATING OF NOT MORE THAN 50.
- FOR DUCTWORK, PIPING & CONDUIT PENETRATIONS THROUGH SOUND-RATED WALLS REFER TO DETAILS AND LOCATION OF SOUND-RATED WALLS REFER TO ARCHITECTURAL PLANS.
- AIR-MOVING SYSTEMS SUPPLYING AIR IN EXCESS OF 2,000 CFM TO ENCLOSED SPACES WITHIN THE BUILDING SHALL BE EQUIPPED WITH AN AUTOMATIC SHUTOFF IN COMPLIANCE WITH UMC SECTION 609. THE AUTOMATIC SHUTOFF SHALL BE ACCOMPLISHED BY INTERRUPTING THE POWER SOURCE OF THE AIR-MOVING EQUIPMENT WHEN SMOKE IS DETECTED IN THE MAIN SUPPLY DUCT CONNECTED TO THE EQUIPMENT.
- 13. DIVISION—15 CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE T—24 MANDATORY POST—INSTALLATION TESTING AND COMPLIANCE VERIFICATION AND DOCUMENTING, THE ECONOMIZER OPERATION, OUTSIDE AIR MEASUREMENT FOR EACH EACH, DUCT LEAKAGE TESTING AND DOCUMENTATION AND CONTROL SYSTEM OPERATION PER THE 2008 T—24 REQUIREMENTS.
- 14. LEED COMPLIANCE REQUIREMENTS: COMPLY WITH THE MANDATORY REQUIREMENTS AND OPTIONAL LEED COMPLIANCE REQUIREMENTS AS OUTLINED BELOW FOR MECHANICAL AND PLUMBING SYSTEMS. REFER TO OTHER LEED COMPLIANCE REQUIREMENTS SPECIFIED IN THE LEED CHECKLIST TITLED "LEED FOR NEW CONSTRUCTION v2.2 WORKSHEET FOR HINDU COMMUNITY AND CULTUREAL CENTER PHASE—1B BUILDING—C ADMINISTRATION BUILDING. ADDRESS:1232 ARROWHEAD AVENUE".

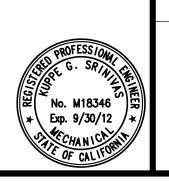
	CREDIT#	POINTS	<u>DESCRIPTION</u>
_	WEc3.1	1	WATER USE REDUCTION, 20% REDUCTION
_	EAcP1	MANDATORY	FUNDAMENTAL COMMISSIONING OF THE BUILDING ENERGY SYSTEMS
_	EAp2	MANDATORY	MINIMUM ENERGY PEFORMANCE 9TITLE-24 COMPLIANCE)
_	EAp3	MANDATORY	FUNDAMENTAL REFRIGERANT MANAGEMENT (NO CFC & HCFC)
_	EAc1	2	OPTIMIZE ENERGY PERFORMANCE (14% BETTER THAN 2008 TITLE-24)
-	EQp1	MANDATORY	MINIMUM IAQ PERFORMANCE. COMPLY WITH ASHRAE 62.1 FOR VENTILATION.
_	EQc3.1	1	CONSTRUCTION IAQ MANAGEMENT PLAN, DURING CONSTRUCTION.
_	EQc3.2	1	CONSTRUCTION IAQ MANAGEMENT PLAN, BEFORE OCCUPANCY.
_	EQc5	1	INDOOR CHEMICAL & POLLUTANT SOURCE CONTROL.

DR	AWING LIST - BUILDING "C"
DWG. NO.	DESCRIPTION
M10.0B	MECHANICAL LEGEND, DRAWING INDEX, GENERAL NOTES
M11.1B	MECHANICAL EQUIPMENT SCHEDULES
M11.2B	MECHANICAL EQUIPMENT SCHEDULES
M11.3B	SPECIFICATIONS
M11.4B	SPECIFICATIONS
M13.0B	MECHANICAL PLAN — BUILDING C
M14.0B	MECHANICAL ROOF PLAN — BUILDING C
M15.0B	MECHANICAL DETAILS — BUILDING C
T24.1	TITLE-24 COMPLIANCE FORMS - OUTDOOR LIGHTING ONLY
T24.1B	TITLE-24 COMPLIANCE FORMS
T24.2B	TITLE-24 COMPLIANCE FORMS
T24.3B	TITLE-24 COMPLIANCE FORMS
T24.4B	TITLE-24 COMPLIANCE FORMS
T24.5B	TITLE-24 COMPLIANCE FORMS
T24.6B	TITLE-24 COMPLIANCE FORMS
T24.7B	TITLE-24 COMPLIANCE FORMS

Al	BBREVIATIONS
ABBR	DESCRIPTION
ACU AD	AIR CONDITIONING UNIT ACCESS DOOR (DUCT)
AFMD	AIR FLOW MEASÙRING DEVICE
AFF AHU	ABOVE FINISHED FLOOR AIR HANDLING UNIT
AP ARCH	ACCESS PANEL (WALL OR CEILING) ARCHITECTURAL
AS	AIR SEPARATOR
ASD AVD	AUTOMATIC SMOKE DAMPER AUTOMATIC VOLUME DAMPER
BDD BHP	BACKDRAFT DAMPER BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BAS BTUH	BUILDING AUTOMATION SYSTEM BRITISH THERMAL UNITS PER HOUR
CBBD	COUNTER BALANCED BACKDRAFT DAMPER
CC CFF	COOLING COIL CAPPED FOR FUTURE
CFM CU	CUBIC FEET PER MINUTE OUTDOOR CONDENSER UNIT
DB	DRY BULB
DDC DEFL	DIRECT DIGITAL CONTROL DEFLECTION
E EA,OA	EXISTING EXHAUST AIR, OUTSIDE AIR
EAT EF	ENTERING AIR TEMPERATURE EXHAUST FAN
ET	EXPANSION TANK
FCU EWT	FAN COIL UNIT ENTERING WATER TEMPERATURE
FA FACP	FIRE ALARM FIRE ALARM CONTROL PANEL
FLA	FULL LOAD AMPS
FPM FPS	FEET PER MINUTE FEET PER SECOND
FSG FT	FLOOR SUPPLY GRILLE FEET
GPM	GALLONS PER MINUTE
HW HC	HEATING HOT WATER HEATING COIL
HP HWP	HORSE POWER HEATING WATER PUMP
HV	HEATING & VENTILATING
KW LAT	KILOWATT LEAVING AIR TEMPERATURE
LEED	LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (USGBC)
LRA LVL	LOCKED ROTOR AMPS LEVEL
LWT	LEAVING WATER TEMPERATURE
MBH MCC	THOUSAND BTU PER HOUR MOTOR CONTROL CENTER
MCP MFR	MOTOR CONTROL PANEL MANUFACTURER
NC	NORMALLY CLOSED OR NOISE CRITERIA
NIMC NO	NOT IN MECHANICAL CONTRACT NORMALLY OPEN
OBD OPER WT	OPPOSED BLADE DAMPER OPERATING WEIGHT
OPP PCD	OPPOSITE PRIMARY CONDENSATE DRAIN
PD	PRESSURE DROP
PH PRESS	PHASE PRESSURE
PSIG RA,SA	POUNDS PER SQUARE INCH RETURN AIR, SUPPLY AIR
REF	REFERENCE
RF RHC	RETURN FAN REHEAT COIL
RPM SAD	REVOLUTIONS PER MINUTE SEE ARCHITECTURAL DRAWINGS
SCD SF	SECONDARY CONDENSATE DRAIN SUPPLY FAN
S.F. SN	SQUARE FEET SHEET NOTES
SP	STATIC PRESSURE
ST STR	SOUND TRAP STRAINER
TCV TCP	TEMPERATURE CONTROL VALVE TEMPERATURE CONTROL PANEL
TD TEF	TEMPERATURE DIFEERENCE TOILET EXHAUST FAN
TEMP	TEMPERATURE
TDH TYP	TOTAL DYNAMIC HEAD TYPICAL
UON	UNLESS OTHERWISE NOTED VAV TERMINAL OR VOLT
VEL	VELOCITY
VFD VIB	VARIABLE FREQUENCY DRIVE VIBRATION ISOLATOR
WB WG	WET BULB
WMS	WATER GAUGE WIRE MESH SCREEN
XFMR OA	TRANSFORMER OUTSIDE AIR

CVAADOL	LEGE	
SYMBOL	ABBR	DESCRIPTION
1 M-1		DETAIL NUMBER DRAWING NUMBER
M7.01		SECTION NUMBER DRAWING NUMBER
AC 1		EQUIPMENT IDENTIFICATION EQUIPMENT NUMBER
(E) (N)		EXISTING NEW
	CSD/CMS	CEILING SUPPLY DIFFUSER
	CER (G)	CEILING EXHAUST REGISTER(GRILLE)
	CRR/CMR (G) WSR	CEILING RETURN REGISTER(GRILLE) WALL SUPPLY REGISTER
—————————————————————————————————————	WER (G) WRR (G)	WALL EXHAUST REGISTER (GRILLE) WALL RETURN REGISTER (GRILLE)
		SECTION THRU SUPPLY OR OUTSIDE AIR DUCT
		SECTION THRU RETURN DUCT
		SECTION THRU EXHAUST DUCT AIR OUTLET DESIGNATION CODE
CODE SIZE CFM DIFFUSER TYPE (SEE SCHEDULES)	FSR	(SEE SCHEDULE) FLOOR SUPPLY REGISTER
CODE SIZE NECK SIZE (SEE PLANS) OR CER1/CRR1/ CRG1		AIR OUTLET DESIGNATION
CEG1 SIZE DUCT SIZE	EXHAUST/RETURN OUTLET	
CODE 1-3.0-5 SUPPLY PLENUM LENGTH(FT.) SLOT WIDTH NO. OF SLOT		LINEAR DIFFUSER DESIGNATION

LEGEND									
SYMBOL	ABBR	DESCRIPTION							
	R (D)	DUCT RISE OR DROP							
=== OR -	AL(PL)	ACOUSTICAL LINING (PLENUM LINING)							
<u> </u>		DUCT ENCLOSED IN GYP. BOARD ENCLOSURE (SEE ARCHITECTURAL DWGS)							
		DIRECTION OF AIRFLOW							
	FC	FLEXIBLE DUCT CONNECTION							
——————————————————————————————————————	AVD	FLEXIBLE DUCT FOR SUPPLY (FLEXIBLE DUCT CONNECTION FOR EXHAUST) AUTOMATIC VOLUME DAMPER							
□ CBBDD	ASD(SD)	AUTOMATIC VOLUME DAMPER							
	CBBDD	COUNTER BALANCED BACK DRAFT DAMPER							
FD	FD	FIRE DAMPER							
DBDD	BDD	BACK DRAFT DAMPER							
FSD	FSD	COMBINATION FIRE/SMOKE DAMPER WITH ACTUATOR							
+ + +	VD	VOLUME DAMPER							
★	VD	VOLUME DAMPER WITH REMOTE REGULATOR							
OR A	TV	TURNING VANES							
⊣ ⊢	BP	BEAM PENETRATION							
		ACCESS PANEL							
		SQUARE TO ROUND DUCT							
OR		REDUCING TRANSITION							
		REDUCING TRANSITION							
UC T		UNDERCUT DOOR — SEE ARCH. DWGS. THERMOSTAT							
TS		TEMPERATURE SENSOR							
DSD, SD——	SD	DUCT SMOKE DETECTOR							
	CFF UP DN	LINE CONTINUED CAPPED FOR FUTURE PIPING UP PIPING DOWN							
——————————————————————————————————————	SL LL CD	REFRIGERANT SUCTION LINE REFRIGERANT LIQUID LINE CONDENSATE DRAIN							
—— G ——	G	NATURAL GAS							
D	D TF	DRAIN TEST FITTING							
	''	UNION							
<u></u>	PG	PRESSURE GAUGE							
¥	TH GV	THERMOMETER GATE VALVE							
	BV	BUTTERFLY (2 1/2" OR LARGER), (BALL VALVE 2" OR SMALLER)							



B

SD

DUCT SMOKE DETECTOR

MECHANICAL LEGEN DWG INDEX, GEN. NO PHASE 1-B

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REVISIONS

Ά\ 05-24-10

B 08-02-10

<u>/D</u>\ 09-22-10

1B RA

HEALTH DEPT PLAN CHECK 08-26-10

<u>∕E\</u> 10-07-10 HCCC

05/28/10
SCALE:
AS NOTED
DRAWN BY:
PROJECT:
ARROWHEAD

M10.0E

												PAK	AGE	D R	00F	TOP	AIR	COND	ITIONII	NG U	NIT	SCH	HEDUL	E							MANUFAC	CTURER: Trane,	Carrier or Ap	proved Equal
	MODEL	C00	LING CAP	PACITY			COOLING	COIL	GA	S HEATING	G CAPACITY			SUPPLY	FAN					FIL	TERS				POWER E	EXHAUST	FAN			UNIT E	LECTRICAL	555 /A5U5	OPER.	DEMARKO
ODE	MODEL	TONS	SENS MBH	TC M	OTAL E	EAT EAT DB WB	LAT DB	LAT WB	 	NPUT MBH)	OUTPUT (MBH)	CFM	ESP (In.W.G.	.) RPM	BHP	HP	MIN. O	TYPE	QTY	CLEAN	PD DIRTY	r EF	FF/MERV	TYPE & MODEL NO.	CFM	SP (In.W.G.	.) BHP	HP	RPM MCA	МОСР	V/PH/HZ	EER/AFUE	WEIGHT LBS.	REMARKS
C-C-1	YHC-048-E3	4	37.2	28 4	9.45	80 67	60	57.6		60	48	1,600	0.8	837	0.42	0.31 kW	300	2"	_	0.35	1"	85,	5/MERV-13	TRANE	1,600	0.375	0.42	0.31 kW	28.30) –	208/3PH/60	15 / 81	1,200	① THRU①
-C-2	YHC-048-E3	4	37.2	28 4	9.45	80 67	60	57.6		60	48	1,600	0.8	837	0.42	0.31 kW	270	2"	_	0.35	1"	85,	5/MERV-13	TRANE	1,600	0.375	0.42	0.31 kW	28.30)	208/3PH/60	15 / 81	1,200	
-C-3	YHC-036-E3	3	27.8	В 3	7.15	80 67	59.95	57.54		60	48	1,200	0.5	832	0.32	0.24 kW	240	2"	-	0.35	1"	85,	5/MERV-13	TRANE	1,200	0.375	0.32	0.24 kW	21.90) –	208/3PH/60	15 / 81	1,000	
-C-4	YHC-036-E3	3	27.8	8 3	7.15	80 67	59.95	57.54		60	48	1,200	0.5	832	0.32	0.24 kW	440	2"	-	0.35	1"	85,	MERV-13	TRANE	1,200	0.375	0.32	0.24 kW	21.90) –	208/3PH/60	15 / 81	1,000	
-C-5	YHC-036-E3	3	27.8	8 3	7.15	80 67	59.95	57.54		60	48	1,200	0.5	832	0.32	0.24 kW	240	2"	_	0.35	1"	85,	5/MERV-13	TRANE	1,200	0.375	0.32	0.24 kW	21.90) –	208/3PH/60	15 / 81	1,000	
C-C-6	YHC-036-E3	3	27.8	8 3	7.15	80 67	59.95	57.54		60	48	1,200	0.5	832	0.32	0.24 kW	240	2"	-	0.35	1"	85,	5/MERV-13	TRANE	1,200	0.375	0.32	0.24 kW	21.90) –	208/3PH/60	15 / 81	1,000	V

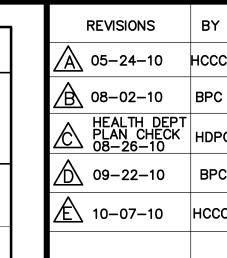
NOTES

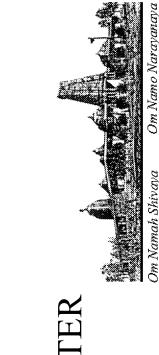
- 1 UNIT LOCATED ON MAIN ROOF ON 14" ROOF CURB.
- 2 UNIT WITH R-410A REFRIGERANT, AI/CU COND & EVAP COILS
- 3 SEER LISTED AT STANDARD CONDITIONS.
- 4 UNIT SELECTION BASED ON 95 F AMBEINT.
- 5 BOTTOM SUPPLY AND RETURN DISCHARGE.
- 6 FACTORY INSTALLED OSA ECONOMIZER CONTROL & POWER EXHAUST & SINGLE-POINT POWER SUPPLY.
- 7) PROVIDE 14" TALL WELDED STEEL CURB, 2007 CBC COMPLIANT, MICROMETL CORP. SERIES OR EQUAL TO MATCH THE AC UNIT SIZE.
- 8 PROVIDE HINGED AND INSULATED ACCESS DOOR AND 2-INCH THICK MERV 13 FILTERS.
- 9 PROVIDE MATCHING ELECTRONIC PROGRAMMABLE, T-24 COMPLIANT 7-DAY WALL THERMOSTAT.
- PROVIDE FACTORY FURNISHED OUTSIDE AIR HOOD AND EXHAUST AIR HOOD AT AC UNIT AIR INLET AND EXHAUST (TYP).
- 1) PROVIDE GAS PRESSURE REGULATOR IF REQUIRED.
- 12 AC UNITS SHALL BE PROVIDED WITH DEMAND CONTROL VENTILATION OPTIONAL PACKAGE AND ROOM CO2 SENSOR TO MODULATE OPEN THE OUTSIDE AIR DAMPER BETWEEN MINIMUM AND MAX SETTINGS (ADJUSTABLE) TO LIMIT THE AMOUNT OF CO2 LEVEL IN THE OCCUPIED SPACE PER T-24.

	EXHAUST FAN SCHEDULE									MFR: GREENHECK						
CODE	SYSTEM	SERVICE	LOCATION	CFM	TOTAL SP	RPM	BHP	MODEL NO./	TYPE	ROOF CURB THROAT SIZE		POWER REQUIREMEN	Т	OPER. WT	SOUND CRITERIA	REMARKS
	STOTEM	SERVIOE	IN. WC SIZE	LXWXH	MTR HP	VFD	V/PH/HZ	LBS	(SONE)	TALIWIA TATA						
EF-C-1		BLDG-C, MENS TOILET ROOM EXH.	ROOF	800	0.5	1411	0.12	G-101-A	MUSHROOM	14X14	1/4	NO	120V/1ø	80	12	123
EF-C-2		BLDG-C, WOMENS TOILET ROOM EXH.	ROOF	700	0.5	1380	0.12	G-101-A	MUSHROOM	14X14	1/4	NO	120V/1ø	80	12	123
EF-C-3		BLDG-C, COPIER ROOM EXH.	ROOF	300	0.5	1180	0.10	G-101-A	MUSHROOM	14X14	1/4	NO	120V/1ø	80	10	123
		<u>I</u>	1			l				L						1

REMARKS:

- 1 PROVIDE FACTORY MATCHED 8" ROOF CURB, FLASHING AND COUNTERFLASHING. SECURE CURB TO THE ROOF STRUCTURE WITH GALV. STEEL ANCHOR BOLTS.
- ② EXHAUST FANS SHALL BE FACTORY FURNISHED WITH BACKDRAFT DAMPER. FACTORY WIRED SPEED CONTROLLER.
- 3 EXHAUST FANS SHALL BE CONTROLLED FROM A CENTRALLY LOCATED ELECTRONIC PROGRAMMABLE TIME CLOCK.





NEW BUILDING "C" - PHASE 1B

NEW BUILDING "C" - PHASE 1B

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MECHANICAL EQUIPMENT SCHEDULES

DATE
05/28/10
SCALE:
AS NOTED
DRAWN BY:
PROJECT:
ARROWHEAD



PROFESS / OMM

REPROFESS / OMM

REPROFES

		FIRE SMOKE DAMPERS SCHEDULE MFR:	RUSKIN
CODE	MODEL NO.	DESCRIPTION	
FSD-1	FSD-60	COMBINATION FIRE/SMOKE DAMPER UL 555S CLASSIFIED AND CLASS I LEAKAGE RATED AND TESTED. PROVIDE 120V ELECTRIC MOTOR ACTUATOR TS 150 FIRESTAT AND MOUNTING ANGLES. FSD TO HAVE PRIMARY HEAT SENSING DEVICE SET AT 165°F AND SECONDARY HEAT SENSING DEVICE SET AT 350°F. POWER OPEN, FAIL CLOSE TYPE. CALIFORNIA STATE FIRE MARSHAL LISTING NUMBER 3225-245-102. FSD SHALL INCLUDE REMOTE POSITION INDICATOR LIGHT PLATE AFFIXED TO THE CEILING TILE.	

EQUIPMENT	TYPE	SERVICE	LOCATION	ISOL	ATOR	ВА	SE	SEISMIC	MODEL NO. ISOLATOR/SEISMIC	REMARKS	
LQOII WILINI	IIFE	SERVICE	LOCATION	CODE	S.D.	CODE	WT#	RESTRAINTS	loop worky oblaming	NEWANNS	
AC-C-1	ROOFTOP ACU	BUILDING C	ROOF	N-1	1/4"	_	_	ANCHOR BOLTS	_	1234	
AC-C-2	ROOFTOP ACU	BUILDING C	ROOF	N-1							
AC-C-3	ROOFTOP ACU	BUILDING C	ROOF	N-1							
AC-C-4	ROOFTOP ACU	BUILDING C	ROOF	N-1							
AC-C-5	ROOFTOP ACU	BUILDING C	ROOF	N-1							
AC-C-6	ROOFTOP ACU	BUILDING C	ROOF	N-1	V	V	V	V	V	V	
EF-C-1	MUSHROOM	TOILET EXH	ROOF	N-1	1/8"	_	-	ANCHOR BOLTS		1234	
EF-C-2	MUSHROOM	TOILET EXH	ROOF	N-1	1/8"	_		ANCHOR BOLTS			
EF-C-3	MUSHROOM	COPY ROOM EXH	ROOF	N-1	1/8"	-	<u>-</u>	ANCHOR BOLTS		12345	

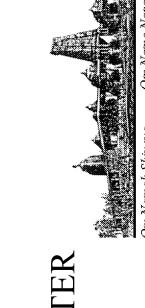
- NOTES:

 1 FANS LOCATED INSIDE THE EQUIPMENT SHALL BE INTERNALLY ISOLATED.
- 2 ANCHOR BOLTS AND ISOLATORS EXPOSED TO WEATHER SHALL BE HOT-DIPPED GALVANIZED OR PROTECTED WITH EXTERIOR GRADE ENAMEL PAINT.
- 3 NEOPRENE SUPER-W PAD ISOLATORS SHALL BE LOCATED BETWEEN THE ROOF CURB AND THE UNIT BASE TO SEAL AND ISOLATE. INSTALL PER MANUFACTURERS' GUIDELINES.
- 4 UNITS WITH FACTORY FURNISHED MATCHING ROOF CURB. SEE EQUIPMENT SCHEDULE.
- 5 PROVIDE WALL MOUNTED LOCAL EXHAUST SWITCH. WIRED BY DIVISION-16.

		AIR OUTLET SCHEDULE	MFR: TITUS U.O.N.									
CODE	MODEL 2	DESCRIPTION 134										
CSD1	PSS	PERFORATED FACE, MODULAR CORE CEILING SUPF STEEL CONSTRUCTION. BORDER TYPE TO MATCH O WHERE REQUIRED FOR BALANCING AND AS INDICA SQUARE TO ROUND TRANSITION FOR CONNECTION	CEILING TYPE. PROVIDE OBD ATED ON DRAWINGS. PROVIDE									
CSD2	PSS	SAME AS CSD1 EXCEPT 12"x12" FACE.										
CER1, CEG1 CRR1, CRG1	PAR	PERFORATED FACE EXHAUST OR RETURN REGISTER OR GRILLE, 24"x24" FACE, STEEL CONSTRUCTION. BORDER TYPE TO MATCH CEILING TYPE. PROVIDE OBD FOR REGISTERS. PROVIDE LINED PLENUM WITH TOP OR SIDE OUTLET FOR DUCT CONNECTION. PROVIDE ACOUSTICAL BOOT WITH VOLUME DAMPER WHERE SHOWN.										
CER2, CEG2 CRR2, CRG2	PAR	SAME AS CER1, CEG1, CRR1, CRG1, EXCEPT 12"	'x12" OR 18"X18" FACE.									

- 1 FINISHES AS SELECTED BY AND APPROVED BY ARCHITECT.
- ② SUFFIX "-A" DESIGNATES ALUMINUM CONSTRUCTION.
- 3 ALL AIR OUTLETS SHALL BE SELECTED FOR NC-25, UNLESS MENTIONED OTHERWISE.
- 4 ALL BRANCH DUCT INLET CONNECTION SIZES SHALL BE THE SAME SIZE AS THE AIR OUTLET DUCT CONNECTION SIZES UNLESS OTHERWISE NOTED. PROVIDE SQUARE TO ROUND DUCT TRANSITION AS REQUIRED.

R	REVISIONS	BY
A	05-24-10	нссс
<u>A</u>	08-02-10	врс
<u></u>	HEALTH DEPT PLAN CHECK 08-26-10	HDPC
\triangle	09-22-10	BPC
£	10-07-10	нссс
		o Narayanaya



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DATE 05/28/10 SCALE: AS NOTED DRAWN BY: PROJECT: ARROWHEAD



PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS:

A. THE GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, AND DIVISION 1 GENERAL REQUIREMENTS OF THE CONTRACT DOCUMENTS ARE HEREBY MADE A PART OF THIS SECTION OF THE SPECIFICATIONS AS FULLY AS IF REPEATED HEREIN.

1.02 DESCRIPTION OF WORK:

- A. PROVIDE ALL LABOR, EQUIPMENT AND MATERIALS THAT ARE REQUIRED, TO PROVIDE A COMPLETE, PROPERLY OPERATING AND SAFE MECHANICAL, PLUMBING, AND FIRE PROTECTION INSTALLATION. THE EXTENT OF THE WORK IS INDICATED ON THE DRAWINGS AND AS DESCRIBED IN THESE SPECIFICATIONS, SHALL INCLUDE ALL THAT MAY BE REASONABLY INFERRED TO BE REQUIRED FOR PROPER EXECUTION OF INSTALLATION WORK AND/OR SYSTEMS' OPERATION.
- B. VERIFY SIZES, CAPACITIES, AND LOCATION OF ALL SERVICES AND UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.
- C. PROVIDE CUTTING AND PATCHING AS REQUIRED FOR EXECUTION OF WORK PERFORMED UNDER THIS SECTION UNLESS SPECIFICALLY PROVIDED FOR, UNDER OTHER SECTIONS.
- D. REPAIR OR REPLACE, TO THE SATISFACTION OF THE OWNER, ANY DAMAGE TO WORK OF THIS SECTION, DAMAGE CAUSED BY LEAKS OR BREAKS IN SYSTEMS OF THIS SECTION, AND DAMAGE CAUSED BY WORK OF THIS SECTION.
- E. COORDINATE WITH WORK PERFORMED BY OTHER SECTIONS, IN ORDER TO ACCOMMODATE THE REQUIREMENTS OF THIS SECTION, AND TO ASSURE ADEQUATE SPACE AND PROPER LOCATION FOR ALL NECESSARY WORK OF THIS PROJECT WHETHER OR NOT WORK IS UNDER THIS SECTION.
- F. PROVIDE ALL NECESSARY RIGGING EQUIPMENT AND MANPOWER TO SET NEW EQUIPMENT AND MATERIALS IN PLACE.
- G. PROVIDE ALL SEISMIC RESTRAINTS REQUIRED BY CODE, OR THIS SPECIFICATION, FOR ALL EQUIPMENT, DUCT, PIPE, AND MATERIALS FURNISHED UNDER THIS SECTION. THIS CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE RESTRAINTS AND FOR PROOF OF ADEQUACY OF THE RESTRAINTS. EQUIPMENT, DUCTWORK, AND PIPING SHALL BE RESTRAINED IN ALL DIRECTIONS TO HANDLE 0.5G LOAD.
- H. PREPARE AND SUBMIT TO THE ARCHITECT LARGE SCALE (MINIMUM 1/4" = 1'-0") COORDINATION DRAWINGS OF ALL CONGESTED AREAS SHOWING LOCATION AND ELEVATIONS OF ALL DUCTS, PIPING, CONDUITS, STRUCTURAL, AND OTHER ITEMS IN THE AREA. THESE DRAWINGS SHALL BE FULLY COORDINATED WITH OTHER TRADES. CHECK ROUTING AND ELEVATIONS OF ALL DUCTWORK AND EQUIPMENT BEFORE FABRICATING. REPORT ANY CONFLICTS THAT CANNOT BE SOLVED IN THE FIELD TO THE ARCHITECT. EXTRA CHARGES SHALL NOT BE ALLOWED DUE TO LACK OF COORDINATION PRIOR TO, OR DURING, CONSTRUCTION.
- I. VALVES AND TRIM NOT SPECIFICALLY INDICATED BUT REQUIRED FOR PROPER FUNCTIONING AND BALANCING OF EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE CRAFT FURNISHING THE EQUIPMENT.
- J. PROVIDE ALL LABOR AND MATERIAL REQUIRED TO SET AND ADJUST THE INSTALLATION SO THAT IT PERFORMS IN ACCORDANCE WITH THE DESIGN INTENT INCLUDED IN THE DRAWINGS AND THESE SPECIFICATIONS.
- K. T-24 & LEED COMPLIANCE: COMPLY WITH THE COMPLIANCE REQUIREMENTS OF T-24 AND LEED FOR NEW CONSTRUCTION v2.2 (USGBC), INCLUDING THE PRE-REQUISITE AND THE OPTIONAL CREDIT POINT REQUIREMENTS UNDER WATER EFFICIENCY, ENERGY & ATMOSPHERE, AND INDOOR ENVIRONMENTAL QUALITY CATEGORIES TO ACHIEVE TARGETTED CERTIFICATION GOALS FOR THE BUILDING PER THE ATTACHED CHECKLIST. CONTRACTOR SHALL INCLUDE IN THE BID PRICE TO PROVIDE MATERIAL. LABOR, TESTING, COMMISSIONING, DOCUMENTATION, CERTIFICATION AS REQUIRED BY CEC, USGBC & CITY OF LIVERMORE.

1.03 CODES AND STANDARDS

- A. THE WORK INSTALLED UNDER THIS SECTION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, REGULATIONS, AND STANDARDS.
- B DO NOT CONSTRUE ANYTHING CONTAINED IN THESE SPECIFICATIONS OR DRAWINGS. TO PERMIT WORK TO BE INSTALLED THAT DOES NOT CONFORM TO CODE.
- C. CONSIDER INTERPRETATIONS AND RULINGS OF THE ENFORCING AGENCIES AS PART OF THESE SPECIFICATIONS IF COMMONLY KNOWN TO THE TRADE.
- D. COMPLY WITH DRAWINGS AND SPECIFICATIONS SHOWING WORK EXCEEDING MINIMUM CODE REQUIREMENTS.
- E. THE CONTRACTOR SHALL FURNISH, WITHOUT ANY EXTRA CHARGE, ADDITIONAL MATERIALS AND LABOR REQUIRED FOR THE COMPLIANCE WITH ANY RULES AND
- F. CEC/T-24, LEED V2.2 REQUIREMENTS AND CITY OF LIVERMORE REQUIREMENTS.

1.04 QUALITY ASSURANCE:

- A. MANUFACTURER'S QUALIFICATIONS: FIRMS REGULARLY ENGAGED IN MANUFACTURE OF THE SPECIFIED PRODUCTS, OF TYPES, MATERIALS, AND SIZES REQUIRED, AND WHOSE PRODUCTS HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR NOT
- B. CONTRACTOR'S QUALIFICATIONS: REGULARLY ENGAGED IN CONSTRUCTION ON PROJECTS OF SIMILAR SIZES USING TYPES OF EQUIPMENT, MATERIAL AND METHODS AS SPECIFIED HEREIN - FOR MINIMUM OF 5 YEARS. A LETTER FROM THE CONTRACTOR CERTIFYING THESE QUALIFICATIONS MUST BE PROVIDED TO THE OWNER/ARCHITECT BEFORE SIGNING THE CONSTRUCTION CONTRACT.
- C. BY ACCEPTING TO WORK, THE CONTRACTOR AGREES THAT HE HAS UNDERSTOOD THE INTENT OF THE DESIGN AND IS REASONABLY SURE THAT IT CAN BE ACCOMPLISHED BY PROCEEDING IN ACCORDANCE WITH THESE DRAWINGS AND SPECIFICATIONS.

1.05 DRAWINGS AND SPECIFICATIONS:

- A. CONSIDER ALL DRAWINGS AND ALL DIVISIONS OF THIS SPECIFICATION AS A WHOLE AND PROVIDE WORK OF THIS DIVISION SHOWN ANYWHERE THEREIN.
- B. ABSOLUTE ACCURACY OF THE DRAWINGS AND SPECIFICATIONS IS NOT GUARANTEED. WHILE REASONABLE EFFORT HAS BEEN MADE TO COORDINATE THE LOCATION OF EQUIPMENT AND MATERIALS WITH THE STRUCTURE AND OTHER TRADES, IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE EXACT REQUIREMENTS AND LOCATIONS AS GOVERNED BY ACTUAL JOB CONDITIONS, MANUFACTURER'S RECOMMENDATIONS ETC. CHECK ALL INFORMATION AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE FABRICATION OR PURCHASING ANY

1.06 LICENSES, PERMITS AND FEES:

A. PROVIDE, PROCURE, AND PAY FOR ALL PERMITS, SERVICES, METERS, LICENSES, FEES, ETC., REQUIRED FOR PERFORMANCE OF WORK OF THIS SECTION.

EQUIPMENT AND IN TIME TO AVOID UNNECESSARY WORK.

B. UPON COMPLETION OF THE WORK, DELIVER TO THE ARCHITECT, ALL CERTIFICATES OF APPROVAL SIGNED BY THE CONTROLLING AUTHORITIES.

1.07 VISIT TO PREMISES:

A. PRIOR TO SUBMISSION OF BID, VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS. NO EXTRA PAYMENT WILL BE MADE FOR ADDITIONAL WORK THAT WOULD HAVE BEEN MADE NECESSARY BY CONTRACTOR'S FAILING TO PROPERLY OBSERVE THE EXISTING CONDITIONS.

1.08 SUBMITTAL DATA:

- 1. SUBMIT MANUFACTURER'S SPECIFICATIONS, DATA SHEETS, CERTIFIED DRAWINGS, AND INSTALLATION INSTRUCTIONS FOR EQUIPMENT, MATERIALS, AND FIXTURES SPECIFIED. INCLUDE PHYSICAL AND PERFORMANCE DATA SUCH AS WEIGHTS, SIZES, CAPACITIES, REQUIRED CLEARANCES, PERFORMANCE CURVES, ACOUSTICAL CHARACTERISTICS, FINISHES, COLOR SELECTION, AND ACCESSORIES. INCLUDE CERTIFIED DRAWINGS ON MAJOR EQUIPMENT SUCH AS AC-UNITS, WATER HEATERS, PUMPS, TANKS, BOILERS AND
- 2. SUBMIT ALL ITEMS FROM EACH SECTION OF THE WORK AT ONE TIME, IF POSSIBLE, BUT DO NOT DELAY SUBMITTALS FOR LACK OF ONE OR TWO ITEMS.

- PREPARE BINDERS FOR PRODUCT DATA, BROCHURES, CATALOG CUTS, ETC., IN THE FOLLOWING SEQUENCE:
- a) INDEX SHEET (WITH EACH ITEM CROSS-IDENTIFIED WITH REFERENCE TO CONTRACT DOCUMENTS AND THE DIVIDER TAB NUMBER)
- b) DIVIDER TAB #1 (WITH ITEM IDENTIFICATION, SUCH AS "AC-1").
- c) THE BROCHURE, PRODUCT DATA SHEET, OR CATALOG CUT FOR THE ITEM.
- d) THE REPEAT b) AND c), ABOVE FOR EACH ITEM OF THE SUBMITTAL (SUCH AS "P-2",

PRODUCT DATA:

- a) SUBMIT MANUFACTURER'S SPECIFICATIONS, DATA SHEETS & CERTIFIED DRAWINGS.
- b) SUBMIT PRODUCTS THAT MEET OR EXCEED THE SPECIFIED MINIMUM ENERGY EFFICIENCY REQUIREMENTS.

B. SHOP DRAWINGS:

- PREPARE AND SUBMIT PLANS, SECTIONS, DETAILS, AND DIAGRAMS TO REQUIRED SCALES FOR SPECIFIED AREAS. DRAWINGS SHALL BE COORDINATED, DIMENSIONED, AND INDICATE EQUIPMENT, PIPE, DUCT, FIRE PROTECTION, AND ELECTRICAL IN RELATION TO ARCHITECTURAL AND STRUCTURAL FEATURES. INCLUDE MINOR PIPING, DRAINS, AIR VENTS, ETC. INDICATE EXACT LOCATIONS AND ELEVATIONS OF ALL VALVES, PIPING SPECIALTIES, ACCESS DOORS, DAMPERS, ETC. HIGHLIGHT ANY DEVIATIONS IN WORK FROM WHAT IS INDICATED ON THE CONTRACT DRAWINGS.
- REQUIRED DRAWINGS HVAC: SUBMIT DRAWINGS, MINIMUM SCALE 1/8" = 1'-0" UNLESS OTHERWISE NOTED.
- 3. REQUIRED DRAWINGS PLUMBING: SUBMIT DRAWINGS, MINIMUM SCALE 1/4" = 1'-0".

C. REVIEW AND RESUBMISSIONS:

- SUBMITTALS MAY BE RETURNED MARKED "NO EXCEPTIONS TAKEN" OR "EXCEPTIONS TAKEN" IN WHICH CASE, RESUBMITTALS ARE NOT REQUIRED, AND WILL NOT BE ACCEPTED.
- 2. CORRECT AND RESUBMIT IN THE ORIGINAL QUANTITIES REQUIRED ALL SUBMITTALS MARKED "EXCEPTIONS AS NOTED".
- 3. SUBMITTALS MARKED "NOT ACCEPTABLE" ARE SO MARKED BECAUSE THE SUBMITTAL IS EITHER SO INCORRECT, INCOMPLETE, OR ILLEGIBLE AS TO PREVENT REVIEW; OR CONTAINS INFERIOR PRODUCT NOT COMPLYING WITH THE SPECIFICATIONS. RESUBMIT REJECTED SUBMITTALS ONLY AFTER APPROPRIATE CORRECTIVE MEASURES ARE TAKEN OR EQUAL PRODUCT SUBSTITUTED.
- 4. SUBMITTALS MARKED "NOT REVIEWED" SHALL INDICATE EXTRA SUBMITTALS THAT WERE NOT REQUIRED TO BE SUBMITTED IN THE FIRST PLACE. THIS ACTION DOES NOT IMPLY ACCEPTANCE OR REJECTION AND CONTRACTOR REMAINS OBLIGATED TO ENSURE THAT THE PRODUCT MEETS DRAWINGS AND SPECIFICATIONS.
- 5. IDENTIFY ALL RESUBMITTALS AS BEING RESUBMITTALS AND IDENTIFY WITH THE ORIGINAL ARCHITECT'S TRANSMITTAL NUMBER.

1.09 SUBSTITUTIONS:

- WHERE POSSIBLE, MORE THAN ONE MANUFACTURER OR VENDOR ARE LISTED FOR ACCEPTABLE MATERIALS AND/OR EQUIPMENT TO BE USED IN THE WORK. THE MATERIAL AND/OR EQUIPMENT OF ONE OF THE MANUFACTURERS OR VENDORS MAY BE CITED AND SPECIFIED BY MODEL NAME, NUMBER, OR DESCRIPTION AS THE ESTABLISHED STANDARD BIDS SHALL BE BASED ON USING ONE OF THE SPECIFIED BRANDS. THE TERM "PRODUCTS" USED BELOW REFERS TO MATERIALS AND EQUIPMENT. WHERE MANUFACTURERS ARE LISTED WITH "OR EQUAL", OR "OR APPROVED SUBSTITUTE", ADDITIONAL MANUFACTURERS MAY BE ACCEPTABLE USING THE SUBSTITUTION PROCEDURES IN THE FOLLOWING
- ADJACENT MATERIALS AND SYSTEMS HAVE BEEN DESIGNED AND DETAILED TO ACCOMMODATE THE ESTABLISHED STANDARD MANUFACTURER'S PRODUCTS. ESTABLISHED STANDARD MANUFACTURERS ARE THE ONES LISTED BY NAME ON THE SCHEDULES OR IN THE DRAWINGS. IF ONE OF THE OTHER ACCEPTABLE MANUFACTURERS IS SELECTED BY THE CONTRACTOR, THE CONTRACTOR SHALL DESIGN AND DETAIL ALL CHANGES IN ALL ADJACENT MATERIALS NECESSARY TO ACCOMMODATE THE SELECTED PRODUCTS, AND WHEN APPROVED, SHALL MAKE SUCH CHANGES TO HIS AND OTHER TRADES' WORK AT NO EXTRA COST TO THE OWNER.

- THE SUCCESSFUL BIDDERS MAY, WITHIN FIFTEEN (15) CALENDAR DAYS AFTER AWARD (CONTRACT, PROPOSE A SUBSTITUTION OF A MATERIAL OR APPARATUS OTHER THAN THOSE SPECIFIED. PROPOSAL SHALL BE IN <u>WRITING</u> AND SHALL INCLUDE CHANGE IN PRICE, DESCRIPTION, AND SPECIFICATION DATA. ARCHITECT SHALL BE THE SOLE JUDGE AS TO THE MERITS OF THE PROPOSED SUBSTITUTE AND RESERVES THE RIGHT TO ACCEPT OR REJECT IT BASED ON PRICE, QUALITY, PAST PERFORMANCE OR DELIVERY, ETC. AND HIS DECISION CAN NOT BE CHALLENGED. SUBSTITUTION PROPOSALS MADE AFTER FIFTEEN DAYS AFTER AWARD OF CONTRACT WILL NOT BE ACCEPTED.
- PRESENT EACH SUBSTITUTION INDIVIDUALLY. IF A PROPOSED SUBSTITUTE IS NOT FOUND TO BE ACCEPTABLE, THEN THE SPECIFIED ITEM MUST BE SUPPLIED.
- FAILURE BY THE CONTRACTOR TO ORDER MATERIALS OR EQUIPMENT IN A TIMELY MANNER WILL NOT CONSTITUTE JUSTIFICATION FOR SUBSTITUTION.
- 4. IF CHANGES TO ADJACENT MATERIALS ARE REQUIRED TO ACCOMMODATE A SUBSTITUTED PRODUCT, ALL THE REQUIREMENTS OF A2 ABOVE APPLY.

1.10 SPACE REQUIREMENTS:

- CONSIDER ALL SPACE REQUIREMENTS FOR ALL WORK INDICATED IN THE CONTRACT DOCUMENTS AND SUBSEQUENT DRAWINGS BEFORE INSTALLING ANY PORTIONS OF THE WORK. SPACE CONFLICTS WHICH OCCUR DURING OR AFTER INSTALLATION OF WORK, CAUSED BY FAILURE TO CONSIDER ALL SUCH REQUIREMENTS, SHALL BE RESOLVED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT AT THE CONTRACTOR'S EXPENSE..
- INSTALL EQUIPMENT AND MATERIALS WITH ALL WORKING PARTS READILY ACCESSIBLE FOR INSPECTION, REPAIR, AND RENEWAL. THE RIGHT IS RESERVED TO MAKE REASONABLE CHANGES IN LOCATIONS OF EQUIPMENT ON THE DRAWINGS PRIOR TO ROUGH-IN WITHOUT INVOLVING ADDITIONAL EXPENSE TO THE OWNER.
- CONFER WITH THE OWNER/ARCHITECT TO ESTABLISH EXACT LOCATIONS, MOUNTING HEIGHTS, AND ARRANGEMENTS OF ALL THE FINISH WORK PRIOR TO ROUGHING IN.

1.11 WORKMANSHIP AND MATERIALS:

- WORKMANSHIP SHALL BE FIRST CLASS THROUGHOUT AND PERFORMED ONLY BY COMPETENT AND EXPERIENCED WORKMEN IN A MANNER SATISFACTORY TO THE OWNER. CONSTANT SUPERVISION OF THE WORK, EITHER BY THE CONTRACTOR OR HIS COMPETENT REPRESENTATIVE, SHALL BE MAINTAINED.
- B. ALL WORK SHALL BE PERFORMED BASED UPON DIMENSIONED AND ACCURATE SHOP DRAWINGS THAT HAVE BEEN APPROVED.
- C. WORK SHALL BE INSTALLED SO AS NOT TO DELAY THE PROGRESS OF CONSTRUCTION AND SHALL BE PROPERLY COORDINATED WITH OTHER TRADES.
- D. USE ONLY NEW MATERIALS IN PERFECT CONDITION. INSPECT ALL MATERIALS UPON ARRIVAL AT

JOB SITE AND IMMEDIATELY REMOVE DEFECTIVE ITEMS FROM SITE.

1.12 CUTTING AND REPAIRING:

INCLUDE ALL CUTTING AND REPAIRING NECESSARY AND REQUIRED FOR THIS INSTALLATION THAT IS NOT COVERED BY OTHER TRADES. <u>STRUCTURAL MEMBERS SHALL NOT BE CUT EXCEPT WITH THE WRITTEN APPROVAL OF THE ARCHITECT.</u> REPAIRING SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADES INVOLVED IN A MANNER SATISFACTORY TO THE ARCHITECT.

- THROUGHOUT THE PROGRESS OF THE WORK, PROTECT ALL PIPE, CONDUIT, DUCTS, FIXTURES, AND EQUIPMENT FROM INTRUSION BY RAIN, DIRT, AND FOREIGN MATTER, AND FROM DAMAGE OF ANY KIND. THOROUGHLY CLEAN ALL METALLIC, PLASTIC, AND PAINTED SURFACES OF
- EQUIPMENT PRIOR TO FINAL INSPECTION. REPLACE WITH NEW MATERIALS ANY DAMAGED WORK, WITHOUT ADDITIONAL COST TO THE OWNER, SO THAT THE ENTIRE INSTALLATION WILL BE LEFT IN NEW CONDITION.
- C. COMPLY WITH THE LEED v2.2 REQUIREMENTS FOR INDOOR ENVIRONMENTAL QUALITY (ITEMS EQ3.1 & EQ3.2) DURING CONSTRUCTION AND PREOCCUPANCY.

1.14 NOISE AND VIBRATION:

- THE LIMITING OF TRANSMISSION OF NOISE AND VIBRATION IS **EXTREMELY IMPORTANT.** THIS CONTRACTOR IS TO PAY PARTICULAR ATTENTION THAT PIPING, EQUIPMENT, AND DUCTWORK IS INSTALLED SO AS NOT TO CHATTER OR RUB AGAINST OTHER MATERIALS, EQUIPMENT, AND THE BUILDING STRUCTURE PROVIDE ISOMODE PADS INSULATION OR OTHER SUITABLE MATERIALS. TO AVOID DIRECT CONTACT AND NOISE CONDITIONS UNACCEPTABLE TO THE OWNER OR TENANTS. CONSIDER, IN PARTICULAR, PROPER SHIELDS AT PIPE HANGERS AND PIPE AND DUCT PENETRATIONS OF WALLS AND FLOORS.
- ANY OBJECTIONAL NOISE AND VIBRATION FROM THE POOR MATERIAL AND INSTALLATION SHALL BE CORRECTED TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST, AS DIRECTED
- C. COMPLY WITH THE LOCAL RULES AND REGULATIONS FOR NOISE CONTROL AT THE PROPERTY

1.15 MANUFACTURER'S INSTALLATION DETAILS:

FOLLOW MANUFACTURER'S INSTALLATION DETAILS EXCEPT AS SPECIFICALLY MODIFIED ON THE DRAWINGS, AND PROVIDE ANY VALVES OR SPECIAL FITTINGS OR OTHER SPECIALTY ITEMS CALLED FOR BY THEM AS REQUIRED IN ORDER TO MAKE THE EQUIPMENT PERFORM AS INTENDED. IF THERE IS ANY DISCREPANCY BETWEEN MANUFACTURER'S IN INSTALLATION DETAILS AND WORK SHOWN ON THE DRAWINGS NOTIFY THE ARCHITECT IMMEDIATELY AND AWAIT FOR FURTHER DIRECTIONS BEFORE PROCEEDING WITH THE INSTALLATION.

- FLUSH PIPES AND DUCTS FREE FROM FOREIGN SUBSTANCES BEFORE INSTALLING VALVES, STOPS, OR MAKING FINAL CONNECTIONS.
- B. AFTER ALL OTHER WORK HAS BEEN ACCOMPLISHED, CLEAN ALL EXPOSED PIPING, DUCTWORK, FIXTURES, EQUIPMENT, AND SUPPORTS. REMOVE ALL DEBRIS OF WORK OF THIS SECTION FROM

1.17 TESTING, ADJUSTING AND BALANCING (TAB):

- A. UPON COMPLETION OF THE WORK, TEST AND REGULATE ALL SYSTEMS TO THE INTENT OF THEIR DESIGN AND TO THE OWNER'S SATISFACTION. FURNISH THE OWNER A BINDER OF THE EQUIPMENT DATA AND INSTRUCT HIS REPRESENTATIVES AS TO THE PROPER OPERATION OF ALL
- B. BALANCE AIR QUANTITIES TO DIFFUSERS AND GRILLES AS SHOWN ON THE DRAWINGS.
- PIPING SYSTEMS FOR GAS, WATER AND DRAINAGE PIPING SHALL BE TESTED TO BE LEAK PROOF. SUBMIT LEAKAGE TEST DATA FOR OWNER'S RECORDS.
- D. WATER FLOWS FOR PUMPS, COILS, VALVES ETC. SHALL BE BALANCED AS SHOWN ON THE
- TAB WORK SHALL BE PERFORMED BY AN INDEPENDANT AIR BALANCING CONTRACTOR PER AABC AND NEBB STANDARDS.
- F. SUBMIT AIR BALANCE REPORT AND OUTSIDE AIR CERTIFICATION PER T-24 REQUIREMENTS FOR EACH SYSTEM AND EACH ZONE.

1.18 FINAL OBSERVATION:

ARCHITECT SHALL MAKE FINAL OBSERVATION OF THE JOB AND NOTE UNACCEPTABLE ITEMS IN A PUNCH LIST. FINAL ACCEPTANCE SHALL NOT BE MADE UNTIL ALL ITEMS ON THIS LIST HAVE BEEN

1.19 GUARANTEE/WARRANTY

- A. ALL MATERIALS, PARTS, EQUIPMENT, MODIFICATIONS MADE, AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE OF THE WORK.
- SHOULD SUCH PARTS, MATERIALS, OR WORKMANSHIP BE FOUND TO BE DEFECTIVE DURING THIS PERIOD, THEY WILL BE RECTIFIED AT NO COST TO THE OWNER. ALL LABOR REQUIRED TO RECTIFY SUCH DEFECTS WILL BE PERFORMED DURING THE NORMAL WORKING HOURS OF THE TRADE INVOLVED
- THIS GUARANTEE IS CONTINGENT UPON THE SYSTEM BEING PROPERLY MAINTAINED BY A QUALIFIED MECHANIC FAMILIAR WITH THIS EQUIPMENT AND THAT THE EQUIPMENT IS NOT ABUSED. EXCLUDED IS NORMAL WEAR AND TEAR, REPLACEMENT OF FILTERS AND BELTS, AND
- A WRITTEN GUARANTEE TO THIS EFFECT SHALL BE SUBMITTED PRIOR TO FINAL PAYMENT AND
- E. IF THE MANUFACTURER PROVIDES FOR A LONGER GUARANTEE PERIOD, IT SHALL ALSO BE

1.20 RECORD DRAWINGS:

- RECORD OF JOB PROGRESS: KEEP AN ACCURATE, DIMENSIONED RECORD OF THE AS-BUILT LOCATIONS OF ALL WORK. KEEP AN UP-TO-DATE ON BLUELINE PRINTS AS THE JOB PROGRESSES AND MAKE THEM AVAILABLE FOR INSPECTION AT ALL TIMES.
- FINAL <u>AS-BUILT</u>, REPRODUCIBLE DRAWINGS AND IN ELECTRONIC FILE FORMAT SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE AND SHALL INCLUDE THE FOLLOWING:
- MAIN SHUT-OFF VALVES PLAINLY MARKED AND IDENTIFIED.
- POSITION OF ALL BURIED OR CONCEALED MAINS ACCURATELY DIMENSIONED, BOTH HORIZONTALLY AND VERTICALLY.
- 3. LOCATIONS OF PIPING, DUCT, AND EQUIPMENT INCLUDING HEIGHT OF MAIN DUCTS, PIPES, AND EQUIPMENT IN THE ATTIC AND ON ROOF.
- 4. CEILING ACCESS PANEL LOCATIONS.

1.21 OPERATION MANUALS AND MAINTENANCE INSTRUCTIONS:

- FURNISH THREE (3) COMPLETE SETS OF OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT (OF ALL TYPES) AND CONTROL SYSTEMS BOUND IN A HARDBOARD BINDER AND INDEXED. SUBMIT NO LATER THAN THIRTY (30) CALENDAR DAYS PRIOR TO SUBSTANTIAL
- B. IN ADDITION TO SPECIFIC REQUIREMENTS SPECIFIED IN THE VARIOUS SECTIONS OF WORK, INCORPORATE THE FOLLOWING:
- 1. COMPLETE OPERATING INSTRUCTIONS FOR EACH ITEM OF EQUIPMENT.
- 2. TEST DATA AND OTHER REPORTS THAT MAY BE SPECIFIED.
- 3. TYPEWRITTEN MAINTENANCE INSTRUCTIONS FOR EACH ITEM OF EQUIPMENT, LISTING IN DETAIL THE LUBRICANTS TO BE USED, FREQUENCY OF LUBRICATION, INSPECTIONS REQUIRED, ADJUSTMENTS, ETC.
- 4. MANUFACTURER'S BULLETINS WITH PARTS' NUMBERS, INSTRUCTIONS, ETC., FOR EACH ITEM OF EQUIPMENT, PROPERLY STRIPPED AND ASSEMBLED.
- 5. SPECIAL DIAGRAMS AND LITERATURE THAT MAY BE REQUIRED.
- A COMPLETE LIST OR SCHEDULE OF ALL MAJOR VALVES GIVING THE NUMBER OF THE VALVE, LOCATION, AND THE ROOMS OR AREAS CONTROLLED BY THE VALVE. PERMANENTLY TAG EACH VALVE WITH BRASS PLATE NUMBER TO MATCH SCHEDULE.
- POWER & CONTROL DIAGRAM, DESCRIPTIONS, AND SEQUENCE OF CONTROLS FOR EACH
- INCLUDE TELEPHONE NUMBERS AND ADDRESSES OF SERVICE COMPANIES.
- AT COMPLETION OF JOB, CONTRACTOR AND MANUFACTURER'S REPRESENTATIVES FOR MAJOR EQUIPMENT INCLUDING THE ROOFTOP AC UNITS, BOILER, WATER HEATERS AND CONTROLS SYSTEMS SHALL MEET WITH THE OWNER'S REPRESENTATIVES TO INSTRUCT OWNER'S REPRESENTATIVES IN OPERATION AND MAINTENANCE PROCEDURES OF THEIR RESPECTIVE EQUIPMENT AND SYSTEMS.
- PROVIDE FUNDAMENTAL COMMISSIONING FOR ALL THE SYSTEMS PER ASHRAE GUIDELINES AND LEED REQUIREMENTS. SUBMIT COMMISSIONING REPORTS FOR ALL EQUIPMENT AND SYSTEMS

PART 2 - MATERIALS

ALL ITEMS OF SIMILAR NATURE SHALL BE BY THE SAME MANUFACTURER. TRIM FOR MAJOR ITEMS SHALL BE FURNISHED BY THE SAME MANUFACTURER AS THE ITEM.

2.02 FINISHES AND PAINTING:

- PROVIDE ALL EQUIPMENT WITH A FACTORY FINISH.
- TOUCH UP SCRATCHES IN FACTORY FINISHED SURFACES TO MATCH ORIGINAL. OBTAIN TOUCH-UP PAINT FROM THE MANUFACTURER OF THE PIECE OF EQUIPMENT.

2.03 PIPES AND FITTING:

- A. COPPER PRESSURE TYPE L; HARD TEMPER: JOINTS 95/5 SOLDER
- TUBING: ASTM A88.
- 2. FITTINGS: ANSI B16.22, WROUGHT COPPER.
- FLANGES: ANSI B16.24, 150 PSIG RATING
- 4. SOLDER: ASTM B32, ALLOY GRADE; 95% TIN, 5% ANTIMONY OR OTHER LEAD FREE SOLDER.
- B. ALL OUTDOOR FERROUS SURFACES SHALL BE HOT-DIP GALVANIZED OR CORROSIONPROOF COATED WITH EXTERIOR GRADE ENAMEL PANIT.
- C. GAS PIPING: INDOOR SCH-40 BLCK STEEL, OUTDOOR SCH-40 GALVANIZED. 2.5" AND BELOW SCREWED AND 3" AND ABOVE WELDED. BELOW GRADE SCH-40 BLCK STEEL WITH CORROSSION

2.04 DIELECTRIC CONNECTIONS:

- B. GENERAL: ISOLATE FERROUS FROM NONFERROUS MATERIALS IN PIPING SYSTEMS AND EQUIPMENT CONNECTIONS WITH DIELECTRIC UNIONS.
- C. DIELECTRIC UNIONS:
- 5. 2" AND SMALLER: EPCO MODEL FX, OR APPROVED SUBSTITUTE, 250 WOG, WITH STANDARD GASKETS FOR PLUMBING AND HIGH TEMPERATURE GASKETS FOR HEATING.
- 6. 2-1/2" AND LARGER: EPCO MODEL X, OR APPROVED SUBSTITUTE, BRASS HALF-UNION, ANSI B16.1, 175 WOG, TO FLANGE.

2.05 GENERAL USE VALVES

- A. PROVIDE JENKINS, STOCKHAM, DEMCO, GRINNELL, DEZURIK, OR NIBCO VALVES. ALL BALL OR BUTTERFLY VALVES FOR GENERAL USE SHALL HAVE EPT SEATS. VALVE HANDLES, EXCEPT IN GROUND, SHALL BE INFINITE THROTTLING WITH MEMORY STOP.
- B. GATE VALVES:
- 1. 1/2" THROUGH 2" THREADED: STOCKHAM FIGURE B-105.
- 2. 1/2" THROUGH 2" SWEAT: B-109, SCREW BONNET. 3. 2-1/2" AND ABOVE - FLANGED: STOCKHAM FIGURE G-623 BRONZE FITTED.

- 1. 1/2" THROUGH 2" BALL VALVE THREADED: STOCKHAM FIGURE S-214-BR-R-T.
- 2. 1/2" THROUGH 2" BALL VALVE SWEAT: STOCKHAM FIGURE S-214-BR-R-S.
- 2-1/2" AND ABOVE BUTTERFLY VALVE: DEMCO SERIES NE, LUG TYPE. PROVIDE INFINITE THROTTLING AND MEMORY STOP HANDLE. VALVES TO PERMIT REMOVAL OF PIPING ON EITHER SIDE WITH VALVE IN PLACE.

D. BALANCE VALVES:

- 1. 1/2" THROUGH 2" BALL VALVE: SAME AS HAND VALVE.
- 2. 2" AND ABOVE PLUG VALVE: HOMESTEAD FIGURE 1522 (SEMI-STEEL BODY).
- 1. 1/2" THROUGH 4" BELL & GOSSETT CIRCUIT SETTER: PROVIDE ONE PORTABLE MODEL RO-2 DIFFERENTIAL PRESSURE METER ASSEMBLY WITH QUICK CONNECTORS.

E. FLOW BALANCING DEVICES:

- F. CHECK VALVES: 1. 2" AND SMALLER - THREADED: STOCKHAM FIGURE B-319.
- 2. 2" AND SMALLER SWEAT: STOCKHAM FIGURE B-309.
- 3. 2-1/2" AND LARGER FLANGED: STOCKHAM FIGURE G-931.
- 2.06 PIPING SPECIALTIES: A. THERMOMETERS AND WELLS: WEKSLER TYPE AF. "ADJUST-ANGLE". 5" DIAL BIMETAL
- BRASS WELL. STEM LENGTH SHALL BE OF THE LENGTH REQUIRED TO OBTAIN AN ACCURATE READING. USE LAYING EXTENSION WHERE PIPE IS INSULATED. SCALE: DOMESTIC HOT WATER AND HEATING WATER 30 TO 240 DEGREES F; CONDENSER WATER

THERMOMETER. STAINLESS STEEL CASE AND STEM, EXTERNAL ADJUSTMENT, AND MATCHING

- 30 TO 160 DEGREES F. CHILLED WATER 30 TO 100 DEGREES F. B. PRESSURE GAUGES: WEKSLER MODEL BA13P OR EQUAL MARSH OR ASHCROFT, 3-1/2" DIAMETER PHENOLASE WITH BLACK NUMERALS ON WHITE FACE. INSTALL WITH TYPE 35 GAUGE COCKS. SELECT DIAL RANGE SO THAT THE NORMAL OPERATING PRESSURE WILL OCCUR AS CLOSE TO
- THE MIDPOINT OF THE DIAL RANGE AS POSSIBLE. PROVIDE PRESSURE, VACUUM, OR COMPOUND C. TEMPERATURE AND PRESSURE TEST STATION: PETERSON ENGINEERING COMPANY, 1/4" OR 1/2" MPT "PETE'S PLUG" WITH SOLID BRASS FITTING CAP. USE NORDEL VALVE CORE FOR WATER,
- AND NEOPRENE VALVE CORE FOR AIR. D. AIR VENTS: HOFFMAN #79 WHERE AUTOMATIC TYPE IS SHOWN UNLESS SPECIFIED OTHERWISE. INSTALL WITH SHUT-OFF VALVES OR COCKS AND DRAIN TO A FLOOR SINK OR DRAIN. PROVIDE LUNKENHEIMER #1778-3/8 INCH COCK FOR MANUAL AIR VENT AT COILS AND AT EACH HIGH POINT
- E. STRAINERS: CHARLES M. BAILEY #100A FOR FERROUS AND #100B OR #100BSJ FOR NON-FERROUS PIPING. ARMSTRONG, OR MUESSCO "Y" PATTERN, STAINLESS STEEL SQUARE MESH OR 3/64" PERFORATIONS. BASKET-TYPE STRAINER - MUELLER #155 WITH 5/32" PERFORATED STAINLESS STEEL SCREEN. INSTALL ALL STRAINERS WITH A BLOW-OFF HOSE

IN PIPING SYSTEMS, PIPE OUTLET TO FLOOR SINK OR FLOOR DRAIN.

VALVE WITH HOSE ADAPTER.

- 2.07 PIPE HANGERS AND SUSPENDED EQUIPMENT, SUPPORTS AND PENETRATIONS:
- A. SUPPORTS AND HANGERS: 1. USE SUPER STRUT, UNISTRUT, B-LINE, ELCEN OR GRINNELL CHANNELS, HANGERS AND STRUCTURAL ATTACHMENTS TO PROPERLY SUPPORT THE PIPING SYSTEM AND

SUSPENDED EQUIPMENT ACCORDING TO GOOD STANDARD PRACTICE AND ACCORDING TO

- THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM SAFETY FACTOR OF 5.0. NO WATER PIPING (HVAC OR DOMESTIC WATER) SHALL HAVE DIRECT CONTACT WITH THE HANGING AND SUPPORT SYSTEM OR THE STRUCTURE. ON PIPES THAT ARE INSULATED, RUN THE INSULATION CONTINUOUS THROUGH THE HANGER AND PROVIDE SHEETMETAL SHIELDS OF PROPER LENGTH AND GAGES UNDER THE INSULATION TO PREVENT CRUSHING. ON UNINSULATED COPPER PIPING, USE STONEMAN "TRISOLATOR" OR SIMILAR
- UNISTRUT OR SUPER-STRUT DEVICE AT EACH HANGER OR SUPPORT POINT. SIZE HANGERS PROPERLY TO FIT AROUND BARE PIPE, ISOLATOR, HANGER SHIELD, OR INSULATION AS REQUIRED.
- 4. SPACE HANGERS FOR HORIZONTAL STEEL PIPES WITH THE MAXIMUM DISTANCE BETWEEN

HANGERS AS FOLI	_OWS:	
NOMINAL SIZE	MAXIMUM SPAN (FEET)	MINIMUM ROD SIZE (INCHES)
1/2"	5	3/8
3/4"	6	3/8
1"	7	3/8
1 1/4"-1 1/2"	9	3/8
2"	10	3/8
2 1/2"	11	1/2
3"	12	1/2

6. SPACE HANGERS FOR HORIZONTAL COPPER TUBE/PIPE WITH THE MAXIMUM DISTANCE BETWEEN HANGERS AS FOLLOWS:

14 5/8

NOMINAL SIZE	MAXIMUM SPAN (FEET)	MINIMUM ROD SIZE (INCHES)
3/4"	6	3/8
1"	7	3/8
1-1/4" - 1-1/2"	9	3/8
2"	10	3/8
2-1/2"	11	1/2
3"	12	1/2
4 "	14	5/8

- 7. TRAPEZE SUSPENSION (TRAPEZE HANGERS MAY BE USED FOR PARALLEL LINES IF PIPES PITCH SAME DIRECTION): SIZE CHANNEL ASSEMBLY IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED LOAD RATINGS. NO DEFLECTIONS SHALL EXCEED 1/180 OF A SPAN WITH A SAFETY FACTOR OF 5.
- 8. USE CADMIUM PLATED OR GALVANIZED HANGERS, ATTACHMENTS, RODS, NUTS, BOLTS AND OTHER ACCESSORIES.
- 9. DO NOT USE WIRE, PLUMBER'S TAPE, OR OTHER MAKE-SHIFT DEVICES FOR HANGERS.
- 10. DO NOT BURN OR WELD ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL OF THE OWNER OR ARCHITECT.
- 11. NO VALVE OR PIECE OF EQUIPMENT SHALL BE USED TO SUPPORT THE WEIGHT OF ANY PIPE FOR PIPES 1-1/2" AND LARGER.
- 12. PROVIDE A SUPPORT OR HANGER CLOSE TO EACH CHANGE OF DIRECTION THE PIPE, EITHER HORIZONTAL OR VERTICAL.
- 13. WHEN PIPING IS INSTALLED USING A TRAPEZE HANGER, BOLT THE PIPE TO THE TRAPEZE USING A PIPE CLAMP, STRAP OR "U" BOLT. DO NOT WELD THE PIPE TO THE TRAPEZE.
- A. ATTACHMENTS TO BUILDING STRUCTURE: (FIGURE NUMBERS INCLUDED ARE GRINNELL
- 1. BEAM SUPPORTS: SUPPORT EQUIPMENT AND PIPING LARGER THAN 4" DIAMETER
- BENEATH CENTERLINE OF BEAM. DO NOT CAUSE ECCENTRIC LOADS ON BEAMS.

2. HANGING FROM METAL DECKING: LOAD AT EACH SUPPORT POINT NOT TO EXCEED: CONCRETE ON METAL DECKING: 200 POUNDS METAL DECKING WITHOUT CONCRETE: 75 POUNDS

UNLESS OTHERWISE NOTED.)

DISTANCE BETWEEN SUPPORT POINTS NOT TO BE LESS THAN 3 FEET. PROVIDE INTERMEDIATE BEAMS OR CHANNELS IF LOADS ARE IN EXCESS OF THE ABOVE (MINIMUM SAFETY FACTOR OF 5.0).

A. SUPPORTS AND HANGERS: 1. USE SUPER STRUT, UNISTRUT, B-LINE, ELCEN OR GRINNELL CHANNELS, HANGERS AND

2.07 PIPE HANGERS AND SUSPENDED EQUIPMENT, SUPPORTS AND PENETRATIONS:

SUSPENDED EQUIPMENT ACCORDING TO GOOD STANDARD PRACTICE AND ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM SAFETY FACTOR OF 5.0. 2. NO WATER PIPING (HVAC OR DOMESTIC WATER) SHALL HAVE DIRECT CONTACT WITH THE HANGING AND SUPPORT SYSTEM OR THE STRUCTURE. ON PIPES THAT ARE INSULATED, RUN THE INSULATION CONTINUOUS THROUGH THE HANGER AND PROVIDE SHEETMETAL SHIELDS OF PROPER LENGTH AND GAGES UNDER THE INSULATION TO PREVENT

CRUSHING. ON UNINSULATED COPPER PIPING, USE STONEMAN "TRISOLATOR" OR SIMILAR

STRUCTURAL ATTACHMENTS TO PROPERLY SUPPORT THE PIPING SYSTEM AND

- UNISTRUT OR SUPER-STRUT DEVICE AT EACH HANGER OR SUPPORT POINT. 3. SIZE HANGERS PROPERLY TO FIT AROUND BARE PIPE, ISOLATOR, HANGER SHIELD, OR INSULATION AS REQUIRED.
- 4. SPACE HANGERS FOR HORIZONTAL STEEL PIPES WITH THE MAXIMUM DISTANCE BETWEEN HANGERS AS FOLLOWS:

:	NOMINAL SIZE 1/2" 3/4" 1" 1 1/4"-1 1/2" 2" 2 1/2"	5 6 7 9 10 11	MINIMUM ROD SIZE (INCHES) 3/8 3/8 3/8 3/8 3/8 1/2 1/2
	4"	14	5/8

6. SPACE HANGERS FOR HORIZONTAL COPPER TUBE/PIPE WITH THE MAXIMUM DISTANCE BETWEEN HANGERS AS FOLLOWS:

	MAXIMUM	MINIMUM R
NOMINAL SIZE	SPAN (FEET)	SIZE (INCHE
3/4"	6	3/8
1"	7	3/8
1-1/4" - 1-1/2"	9	3/8
2"	10	3/8
2-1/2"	11	1/2
3"	12	1/2

PITCH SAME DIRECTION): SIZE CHANNEL ASSEMBLY IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED LOAD RATINGS. NO DEFLECTIONS SHALL EXCEED 1/180 OF A SPAN WITH A SAFETY FACTOR OF 5.

8. USE CADMIUM PLATED OR GALVANIZED HANGERS, ATTACHMENTS, RODS, NUTS, BOLTS

10. DO NOT BURN OR WELD ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL

13. WHEN PIPING IS INSTALLED USING A TRAPEZE HANGER, BOLT THE PIPE TO THE TRAPEZE

USING A PIPE CLAMP, STRAP OR "U" BOLT. DO NOT WELD THE PIPE TO THE TRAPEZE.

7. TRAPEZE SUSPENSION (TRAPEZE HANGERS MAY BE USED FOR PARALLEL LINES IF PIPES

- AND OTHER ACCESSORIES. 9. DO NOT USE WIRE, PLUMBER'S TAPE, OR OTHER MAKE-SHIFT DEVICES FOR HANGERS.
- 11. NO VALVE OR PIECE OF EQUIPMENT SHALL BE USED TO SUPPORT THE WEIGHT OF ANY PIPE FOR PIPES 1-1/2" AND LARGER.

OF THE OWNER OR ARCHITECT.

- 12. PROVIDE A SUPPORT OR HANGER CLOSE TO EACH CHANGE OF DIRECTION THE PIPE, EITHER HORIZONTAL OR VERTICAL.
- B. ATTACHMENTS TO BUILDING STRUCTURE: (FIGURE NUMBERS INCLUDED ARE ANVIL (GRINNELL) UNLESS OTHERWISE NOTED.)

1. BEAM SUPPORTS: SUPPORT EQUIPMENT AND PIPING LARGER THAN 4" DIAMETER

BENEATH CENTERLINE OF BEAM. DO NOT CAUSE ECCENTRIC LOADS ON BEAMS. 2. HANGING FROM METAL DECKING: LOAD AT EACH SUPPORT POINT NOT TO EXCEED:

CONCRETE ON METAL DECKING: 200 POUNDS

DISTANCE BETWEEN SUPPORT POINTS NOT TO BE LESS THAN 3 FEET. PROVIDE INTERMEDIATE BEAMS OR CHANNELS IF LOADS ARE IN EXCESS OF THE ABOVE

3. ANCHOR BOLTS: MATERIAL, DIAMETERS, AND LENGTHS FOR 3,000 PSI.

(MINIMUM SAFETY FACTOR OF 5.0).

METAL DECKING WITHOUT CONCRETE: 75 POUNDS

- 4. CONCRETE INSERTS: FIGURE 282. PLACE REINFORCING STEEL THROUGH INSERT AS RECOMMENDED BY MANUFACTURER FOR RECOMMENDED LOADS.
- 5. POURED-IN-PLACE CONCRETE ON METAL DECKING: SUPERSTRUT FIGURE C-475. 6. BEAM CLAMPS: FIGURE 87, 227, OR 228.

8. SIDE BEAM BRACKETS: FIGURE 202 OR 203.

- 7. WELDED BEAM ATTACHMENT: FIGURE 66.
- 9. HANGER RODS: ASTM A107, HOT ROLLED STEEL WITH ANSI B1.1 THREADS. (MINIMUM SAFTY FACTOR OF 5.0)
- TURNBUCKLES: FIGURE 230. 2. LINKED EYE ROD: FIGURE 278X.

CLEVIS: FIGURE 299.

C. HANGER ROD FIXTURES:

- D. PIPE ATTACHMENTS: (FIGURE NUMBERS BY GRINNELL)
- 2. U-BOLT: FIGURE 137. 3. STANCHION: FIGURE 259.

ADJUSTABLE CLEVIS: FIGURE 260 OR 300.

- 4. VERTICAL PIPE SUPPORTS: FIGURE 261.

REVISIONS

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05/28/10 AS NOTED DRAWN BY:

PROJECT:

ARROWHEAD

SECTION 15000 (CONTINUED)

- PENETRATIONS AND ESCUTCHEONS: WHERE WORK OF THIS DIVISION PASSES THROUGH FIRE RATED PARTITIONS, WALLS, FLOORS, CONCRETE SLABS OR EXTERIOR WALLS. PACK SPACE BETWEEN PIPING AND PENETRATION OPENING WITH MATERIAL APPROVED BY UNDERWRITER LABORATORIES FOR IN THROUGH PENETRATION FIRE STOP SYSTEMS. MATERIALS, METHODS AND INSTALLATION SHALL BE IN ACCORDANCE WITH UL APPROVED LISTING AND SHALL BE DESIGNED TO ACT AS A FIRESTOP AS WELL AS A COLD SMOKE, NOXIOUS GAS AND WATER SEALANT
 - FOR NON-RATED WALLS, SLEEVES SHALL BE A MINIMUM OF 2" LARGER THAN THE PIPE AND EXTEND 2" ABOVE FLOOR SLABS. USE PIPE SHIELDS, INC., UNLESS OTHERWISE NOTED. PROVIDE SLEEVES AS FOLLOWS:
- NONINSULATED PIPING:
- A. NONRATED WALL: SEAL ANNULAR SPACE WITH FIBERGLASS.
- INSULATED PIPING:
- A. NONRATED WALL: MODEL WFB-CS AND WFB-CS-CW.
- 3. PIPES THROUGH EXTERIOR WALL: SEAL ANNULAR SPACE WITH FIBERGLASS AND CAULK WEATHERTIGHT
- PROVIDE ESCUTCHEON PLATES THAT ARE NEAT, RIGID, SECURELY ATTACHED WHERE WORK OF THIS SECTION PENETRATES THE STRUCTURE. PROVIDE STAINLESS STEEL OR CHROME PLATED BRASS IN FINISHED AREAS OR WHERE REQUIRED FOR PROPER APPEARANCE AND GALVANIZED STEEL ELSEWHERE.

2.08 PIPE AND EQUIPMENT INSULATION:

- 1. THE TERM PIPING HEREIN, SHALL INCLUDE HOT WATER PIPES, PUMPS, VALVES, STRAINERS AND FITTINGS. APPLY HI-LO TEMP INSULATION TO THE FITTINGS AND COVER WITH "ZESTON" FITTING CLOSURES. TUCK THE ENDS OF THE HI-LO TEMP INSULATION INTO THE THROAT OF THE FITTING AND THE EDGES ADJACENT TO THE PIPE COVERING TUFTED AND TUCKED IN, FULLY INSULATING THE FITTING BEFORE APPLYING FITTING COVER. SECURE THE FITTING COVER BY BANDING OR TAPING THE ENDS TO THE ADJACENT PIPE COVERING. EXTEND THE INSULATION ON THE VALVES UP TO THE VALVE BONNET. LEAVE STRAINER CLEANOUT PLUGS ACCESSIBLE. AT UNIONS: MITER INSULATION AT 45 DEGREES AND COAT EXPOSED INSULATION WITH INSULATING CEMENT. HEATING WATER VALVES DO NOT HAVE TO BE
- 2. INSULATE ALL HOT WATER SUPPLY AND RETURN PIPING, AND PIPING SYSTEM COMPONENTS.
- 3. USE MASTICS AND ADHESIVES UNDILUTED UNLESS NOTED OTHERWISE. DILUTE FOSTER 30-36 NO GREATER THAN 1 PART WATER TO 5 PARTS 30-36.
- 4. BUTT INSULATION AT EACH END AND SEAL THE JOINTS WITH PRESSURE SENSITIVE TAPE.
- 5. INSTALL ALL INSULATION TO ALLOW FOR THE OPERATION OF ALL MOVING PARTS AND TO PERMIT
- VIEWING OF ALL NAME PLATES, CONTROLS, INSTRUMENTS, DAMPERS AND VALVE BONNETS AND STEMS.
- 6. THOROUGHLY CLEAN, TEST AND HAVE APPROVED, ALL PIPING AND EQUIPMENT BEFORE INSTALLING
- 7. INSTALL INSULATION WITH THE HIGHEST QUALITY WORKMANSHIP. ALL ENDS SHALL BE NEATLY TRIMMED
- 8. MANUFACTURER: OWENS-CORNING FIBERGLASS, ARMSTRONG, MANVILLE, OR CERTAIN-TEED.
- B. TYPE AND THICKNESS:
- 1. GENERAL: IN ACCORDANCE WITH 2008 TITLE 24 ENERGY REGULATIONS.
- 2.09 EQUIPMENT SUPPORTS:
- A. ALL ROTATING EQUIPMENT AND EQUIPMENT CAPABLE OF TRANSMITTING VIBRATION INTO THE SPACE SHALL BE MOUNTED ON VIBRATION ISOLATORS. ISOLATORS SHALL BE PROPERLY SIZED BY THE ISOLATOR MANUFACTURER, TAKING INTO ACCOUNT THE PIECE OF EQUIPMENT, ITS CENTER OF GRAVITY, ANCHOR POINTS. AND THE STRUCTURE UPON WHICH IT IS SETTING, SO THAT VIBRATION TRANSMITTED TO THE STRUCTURE IS HELD TO A LEVEL ACCEPTABLE TO THE OWNER.
- B. ISOLATORS SHALL BE AS REQUIRED TO LIMIT THE TRANSFER OF VIBRATION AND NOISE TO THE STRUCTURE AND OCCUPIED AREAS.
- C. THE ISOLATORS SHALL BE FASTENED TO THE STRUCTURE AND TO THE EQUIPMENT WITH PROPERLY SIZED AND STRUCTURALLY ENGINEERED ANCHORS AND BOLTS. IF STRUCTURAL CALCULATIONS ARE REQUIRED BY THE BUILDING INSPECTORS OR BY CODE THEY SHALL BE PROVIDED BY THE ISOLATOR MANUFACTURER OR
- D. ISOLATORS SHALL BE AS MANUFACTURED BY MASON, KINETICS, OR AMBER-BOOTH. OTHER MANUFACTURERS NOT ALLOWED.
- E. ISOLATOR SPRINGS SHALL BE AS FOLLOWS:
- 1. CADMIUM-PLATED HELICAL STEEL SPRINGS WITH MINIMUM DIAMETER 0.8 OF OPERATING HEIGHT.
- 2. RESERVE DEFLECTION (FROM OPERATING TO SOLID HEIGHT) 50% OF SPECIFIED DEFLECTION.
- 3. RATIO OF HORIZONTAL TO VERTICAL SPRING CONSTANTS SHALL BE WITHIN RANGE OF 0.90 TO 1.10.
- 4. PROVIDE CORROSION RESISTANT PROTECTION FOR ALL SPRINGS AND THEIR HOUSINGS, FOR OUT-OF-DOORS INSTALLATIONS. AND ALSO FOR MATERIALS EXPOSED TO OUT-OF-DOORS DURING

CONSTRUCTION. HOT-DIPPED GALVANIZED OR COATED WITH NEOPRENE OR POLYVINYLCHLORIDE.

- F. THE EQUIPMENT MANUFACTURER SHALL FURNISH THE WEIGHT OF THE EQUIPMENT AT EACH POINT OF
- ALL ISOLATORS SHALL BE PROPERLY ADJUSTED SO THAT EQUIPMENT IS LEVEL, SNUBBERS AND SEISMIC TYPE MOUNTS ARE CENTERED, AND NO SHORT CIRCUITING OCCURS. THEY WILL BE READJUSTED AS NECESSARY DURING THE WARRANTY PERIOD, AT NO COST TO THE OWNER, TO ASSURE PROPER OPERATION.
- H. ALL CONNECTIONS TO VIBRATING EQUIPMENT SUCH AS PIPING, CONDUITS, AND DUCTWORK SHALL BE
- INSTALLED SO THAT SHORT CIRCUITING DOES NOT OCCUR. 1. CONDUITS SHALL HAVE FLEXIBLE CONNECTIONS LOOPED IN AT 90 DEGREES TO ALLOW FOR MOVEMENT.
- 2. PIPING SHALL HAVE FLEXIBLE CONNECTORS WHERE SPECIFIED OR SHALL HAVE SUFFICIENT SPRING LEGS OR CHANGES IN DIRECTION BEFORE THE FIRST HANGER TO DAMPEN VIBRATION AND ASSURE THAT PIPING IS NOT WORK HARDENED.
- 2.10 SEISMIC RESTRAINTS:

REQUIREMENTS:

- A. GENERAL: PROVIDE SEISMIC RESTRAINTS PER APPLICABLE CODE AND STANDARDS AS SPECIFIED AND/OR INDICATED. DESIGN AND PROVIDE RESTRAINTS TO PREVENT PERMANENT DISPLACEMENT IN ANY DIRECTION CAUSED BY LATERAL MOTION, OVERTURNING OR UPLIFT. RESTRAINTS SHALL NOT SHORT CIRCUIT VIBRATION ISOLATED EQUIPMENT UNDER NORMAL OPERATION.
- 1. CRITERIA: DESIGN RESTRAINTS FOR PIPING AND DUCTWORK PER SMACNA "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS" OR ANY SIMILAR PREAPPROVED HANGER MANUFACTURER'S DETAILS. SUBMIT REQUIRED STRUCTURAL CALCULATIONS FOR RIGIDLY ATTACHED EQUIPMENT.
- 2. SEISMIC FORCE CRITERIA: RIGIDLY ATTACHED: 1.0G FLEXIBLY ATTACHED: 1.0G
- 3. CONTRACTOR TO SUBMIT SEISMIC RESTRAINT CALCULATIONS THAT ARE SIGNED BY A STRUCTURAL ENGINEER REGISTERED IN CALIFORNIA. CALCULATION MUST CONFIRM THE ADEQUACY OF THE RESTRAINTS AND THEIR ANCHORING TO THE BUILDING STRUCTURAL ELEMENTS.
- 4. AFTER INSTALLATION, CONTRACTOR SHALL ISSUE IN WRITING, AND SIGNED BY A REGISTERED STRUCTURAL ENGINEER THAT ALL SEISMIC RESTRAINTS HAVE BEEN INSTALLED TO MEET THE APPLICABLE CODES AND CONTRACT DOCUMENTS.
- 5. SEISMICALLY ANCHOR ALL EQUIPMENT WHICH ARE MOUNTED 4 OR MORE FEET ABOVE THE FLOOR OR WEIGHS MORE THAN 400 POUNDS. SUBMIT SEISMIC ANCHORAGE CALCULATIONS FOR SEISMIC CATEGORY D FOR BOTH FLEXIBLY & RIGIDLY SUPPORTED EQUIPMENT PREPARED BY A REGISTERED STRUCTURAL ENGINEER IN THE STATE OF CALIFORNIA. USE ap = 2.5 AND Rp = 6.0 FOR HVAC EQUIPMENT CONSTRUCTED OF SHEET METAL FRAMING.
- 6. REFER TO STRUCTURAL PLANS FOR SEISMIC CALCULATIONS FOR ROOFTOP AC UNITS AND FOR STRUCTURAL FRAMING. SUBMIT FINAL EQUIPMENT LOCATIONS. WEIGHTS AND ANCHORAGE REQUIREMENTS TO THE PROJECTY STRUCTURAL ENGINEER-OF-RECORD AND OBTAIN APPROVALS BEFORE PROCEEDING WITH THE INSTALLATION.
- 7. OSHPD PRE-APPROVED SEISMIC SUPPORT & BRACING SYSTEM MAY BE USED IN-LIEU OF CUSTOM DESIGN. ACCEPTABLE MANUFACTURERS - MASON, NUSIG, TOLCO OR APPROVED EQUAL.

- 5. RESTRAINT TO INCLUDE THE FOLLOWING:
- FANS. AIR HANDLING UNITS. ROOFTOP AC UNITS. PIPING, EXPANSION TANKS, AND ASSOCIATED EQUIPMENT AND PIPING.
- DUCTS (SUPPLY, RETURN, EXHAUST, RELIEF).
- WATER HEATERS, HEAT EXCHANGERS AND HOT WATER STORAGE TANKS. GAS PIPING.
- 2.11 ACCESS DOORS AND PANELS:
- A. WHERE REQUIRED: WHEREVER A PIECE OF EQUIPMENT OR VALVE AND OPERATOR IS INACCESSIBLE AND REQUIRES ACCESS FOR MAINTENANCE, REPAIR OR ADJUSTMENT.
- SIZE: SIZE IS DEPENDENT UPON THE RELATIONSHIP OF THE DOOR TO THE PRODUCT BEING SERVICED; THEREFORE, THE SIZE OF THE DOOR SHALL BE SELECTED TO PROVIDE CONVENIENT ACCESS TO ITS
- MANUFACTURER: INRYCO/MILCOR, OR EQUAL BILCO, CESCO, OR KARP.
- F. FURNISH TO OWNER THE FOLLOWING: ONE SET OF ANY SPECIAL TOOLS REQUIRED TO OPERATE, ADJUST, DISMANTLE, OR REPAIR ANY EQUIPMENT IN THIS DIVISION. "SPECIAL TOOLS" MEANS THOSE NOT NORMALLY POSSESSED BY MECHANICS OR MAINTENANCE PERSONNEL.
- 2.15 ROOFTOP AIR CONDITIONING UNITS:
- A. ROOFTOP AC UNITS SHALL BE GAS ELECTRIC PACKS AS SCHEDULED. ACCEPTABLE MANUFACTURERS SHALL BE TRANE, CARRIER, MCQUAY, YORK OR EQUAL. TRANE IS THE BASIS OF DESIGN.
- B. AC UNITS SHALL USE R-410A (NO CFC AND HCFC UNITS ALOOWED) AND CALIFORNIA ENERGY
- C. UNITS SHALL BE PROVIDED WITH MATCHING 12' ROOF CURB AND ISOLATION PADS.
- UNITS SHALL BE SEISMICALLY ANCHORED TO THE ROOF STRUCTURE. SUBMIT SEISMIC CALCULATIONS PREPARED BY A REGISTERED STRUCTURAL ENGINEER IN THE STATE OF CALCIFORNIA. COORDINATE WITH THE ROOF STRUCTURE PROVIDER AND ROOFING CONTRACTOR FOR FLASHING AND
- PROVIDE T-24 COMPLIANT MATCHING ELECTRONIC ROOM THERMOSTAT. THERMOSTATS SHALL BE ADAPTABLE FOR FUTURE INTEGRATION TO A BUILDING CONTROL SYSTEM. FOR UNITS SERVING ASSEMBLY OCCUPANCIES AND CONFERENCE ROOMS, PROVIDE MATCHING CARBON DIOXIDE (CO2) SENSORS AND CONTROLS TO ADJUST THE OUTSIDE AIR AUTOMATICALLY PER THE T-24 REQUIREMENTS.
- PROVIDE MOTORIZED OUTSIDE AIR AND RELIEF AIR DAMPERS.
- G. UNITS SHALL BE STARTED-UP AND COMMISSIONED BY A FACTORY TRAINED TECHNICIAN AND A COMMISSIONING REPORT SHALL BE SUBMITTED TO SATISFY THE LEED BASIC COMMISSIONING
- PROVIDE ALL UTILITIES POWER, CONTROLS, GAS, CONDENSATE DRAIN CONNECTIONS PER THE MANUFACTURER INSTALLATION GUIDELINES. PROVIDE UL LISTED FLEX CONNECTORS FOR GAS, POWER, CONTROLS. TERMINATE THE CONDENSATE DRAINS TO THE JANITOR SINK INDIRECTLY.
- PROVIDE ACOUSTICALLY LINED SUPPLY AND RETURN MAIN DUCTS IN THE CEILING PLENUM BELOW. COORDINATE DUCT SIZE AND ROUTING WITH THE ARCHITECTURAL REFLECTED CEILING PLANS, ROOF STRUCTURE, SPRINKLER PIPING AND LIGHTING.

2.16 DUCTWORK

- GENERAL: FABRICATE DUCTWORK OF G60 GALVANIZED SHEET METAL IN ACCORDANCE WITH LATEST EDITION OF THE SMACNA, DUCT MANUAL, AND ASHRAE GUIDE. SEAL AND TAPE ALL DUCT JOINTS AIRTIGHT.
- ACOUSTICAL LINING: ACOUSTICAL LINING SHALL BE 1" THICK, COATED FLEXIBLE DUCT LINER AND SHALL MEET UL-181 REQUIREMENTS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- FLEXIBLE ROUND DUCTS: UL CLASS 1 AIR DUCTS WITH HELICAL SUPPORT WIRE, SCRIM CLOTH INNER LINER, R-4 INSULATION AND OUTER PLASTIC LINER: CODY/WEST OR
- M. FLEXIBLE DUCT CONNECTOR: VENTFABRICS, INSTALL TO MAINTAIN NOT LESS THAN 2" METAL TO METAL SEPARATION.

- A. BALANCING DAMPERS: PER SMACNA PROVIDE HARD LOCKING QUADRANT, WITH RAISED CHAIR FOR INSULATED DUCTS.
- B. CONTROL DAMPERS: PER SMACNA, RUSKIN FSD-60 OR EQUAL. C. BACKDRAFT DAMPERS: RUSKIN CBD6 OR EQUAL.

2.18 ELECTRIC MOTORS:

- A. PREMIUM EFFICIENCY, VOLTAGE AND PHASE TO MATCH THE APPLICATION, WEATHER ENCLOSURE TO MATCH THE APPLICATION AND LOCATION.
- B. MANUFACTURER: BALDOR SUPER-E, RELIANCE, GE, WESTINGHOUSE OR APPROVED

2.19 VARIABLE FREQUENCY DRIVES:

A. MANUFACTURERS: ABB, DANFOSS, SAFTRONICS, YASKAWA, RELIANCE, GE OR APPROVED EQUAL

2.20 AIR BALANCE AND WATER BALANCE

- A. PERSONNEL PERFORMING BALANCING AND TESTING SHALL BE FULLY QUALIFIED, EXPERIENCED, AND NORMALLY ENGAGED IN THIS TYPE OF WORK. IF THE CONTRACTOR DOES NOT HAVE SUCH PERSONNEL AVAILABLE FROM HIS OWN COMPANY, HE SHALL HIRE, AT HIS OWN EXPENSE, SUBCONTRACTORS WHO ARE QUALIFIED.
- B. PROVIDE ALL LABOR, EQUIPMENT, AND MATERIALS REQUIRED TO PERFORM TESTS AND BALANCING.
- C. SUBMIT FINAL AIR BALANCE REPORT TO BUILDING INSPECTION DIVISION PRIOR TO FINAL

2.21 DUCT LINER AND PLENUM LINER

- A. FLEXIBLE, COATED, FIBERGLASS DUCT LINER, 1" THICK (2" FOR OUTDOOR DUCTS), 1.5 PCF DENSITY, 0.24 BRUH/SQ.FT.DEG F/IN. AT 75 °F, NOISE REDUCTION COEFFICIENT OF 0.6 FOR 1", #6 MOUNTINGS, OWNES CORNING AEROFLEX PLUS OR EQUAL. DUCT LINING MATERIAL SURFACE THAT COMES IN CONTACT WITH THE AIR FLOW SHALL BE RESISTANT TO MOLD, HUMIDITY AND ERROSION AND COMPLY WITH CMC SECTION 605.
- B. COMPLY WITH CMC AND SMACNA DUCT LINER APPLICATION STANDARD.
- C. MANUFACTURER: KNAUF, CERTAIN-TEED CORP., MANVILLE, OWENS-CORNING OR

2.22 FLEXIBLE DUCTS

- A. FLEXIBLE DUCT SHALL BE CLASS-I AIR DUCT PER UL 181 AND SHALL COMPLY WITH NFPA 90A AND 90B AND CALIFORNIA MECHANICAL CODE. SHALL HAVE A FLAME SPREAD RATING OF LESS THAN 25 AND A SMOKE DEVELOPED RATING OF LESS THAN 50.
- B. MANUFACTURER: MODULAR FLEX, THERMAFLEX OR EQUAL.
- MODULAR FLEX, POLY CORE, R-4.2, UNIVERSAL DUCT CLAMP DAMPER, POLYETHYLENE JACKET, PERMEABILITY = 0.17, R 4.2 FIBERGLASS INSULATION (ASTM C-518), FIBERGLASS THEREADED MESHA SCRIM, CORE-POLY LINER, HELIX- ENCAPSULATED HARD DRAWN SPRING WIRE, 2" ± W.C. PRESSURE RATING, 200° F, 4000 FT/MIN VELOCITY, UL181 CLASS
- ATTACH THE FLEX DUCTS USING FACTORY-MADE $\frac{9}{16}$ "-WIDE STAINLESS STEEL CLAMPS. THE OUTER JACKET SHALL BE SECURED USING 0.35"-WIDE SELF-LOCKING NYLON STRAPS-PANDUIT CORP. OR EQUAL. THE JACKET ENDS TAPED WITH APPROVED TYPE MASTIC TAPE.

2.23 HVAC CONTROL SYSTEM

- A. PROVIDE PROGRAMMABLE T-24 COMPLIANT ELECTRONIC ROOM THERMOSTAT COMPATIBLE WITH THE ROOFTOP AC UNIT INSTALLED. THE THERMOSTAT SHALL HAS SET-UP AND SET-BACK FEATURES, DIGITAL TEMPERATURE DISPLAY, NETWORKABLE IN FUTURE.
- B. MANUFACTURERS: HONEYWELL, TRANE, CARRIER OR APPROVED EQUAL.
- PROVIDE LOCKABLE, SEE THRU, HEAVY DUTY PLASTIC THERMOSTAT GUARD, ONE FOR EACH THERMOSTAT

PART 3 - EXECUTION

3.01 PIPING INSTALLATION:

SHOWN TO FACILITATE MAINTENANCE.

- SYSTEM LAYOUTS AS INDICATED ON DRAWINGS ARE GENERALLY DIAGRAMMATIC, BUT SHALL BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION AND WORK OF OTHER TRADES WILL PERMIT.
- DRAWINGS AND ARRANGEMENT: INSTALL EQUIPMENT AND MATERIALS WITH ALL WORKING PARTS READILY ACCESSIBLE FOR INSPECTION, REPAIR, AND REMOVAL.
- ANY SECTION OF PIPE FOR WHICH SIZE IS NOT SHOWN OR ANY INTERMEDIATE SECTION ERRONEOUSLY SHOWN OBVIOUSLY UNDERSIZED SHALL BE THE SAME SIZE AS THE LARGEST LINE CONNECTING TO IT.
- THOROUGHLY CLEAN ALL PIPE AND MAINTAIN IN SUCH CONDITION THROUGHOUT CONSTRUCTION. TEMPORARILY CAP OFF PLUG ENDS OF UNPROTECTED PIPE.
- INSTALL UNIONS AT CONNECTIONS TO EQUIPMENT, ON SERVICE SIDE OF VALVES AND ELSEWHERE AS REQUIRED OR
- INSTALL DIELECTRIC INSULATING CONNECTIONS BETWEEN ALL DISSIMILAR METALS UNLESS OTHERWISE INDICATED.
- RUN ALL PIPING GENERALLY LEVEL, FREE OF UNNECESSARY TRAPS AND BENDS, AND ARRANGE TO CONFORM TO THE BUILDING REQUIREMENTS AND TO SUIT NECESSITIES OF CLEARANCE FOR OTHER WORK.
- ARRANGE PIPING AND HANGERS TO ALLOW FOR EXPANSION, CONTRACTION, AND STRUCTURAL SETTLEMENT. DO NOT INSTALL PIPING IN CONTACT WITH THE BUILDING STRUCTURE
- MAKE CHANGES IN SIZE OR DIRECTION WITH MANUFACTURED FITTINGS. THE USE OF BUSHINGS, REDUCING FLANGES, OR BENDING OF A PIPE IS NOT ALLOWED. INSTALL PIPING FULL SIZE THROUGH SHUT-OFF VALVES, BALANCING VALVES, ETC. CHANGE PIPE SIZE WITHIN THREE
- PIPE SIZE DIAMETERS OF THE FINAL CONNECTION TO FIXTURES AND EQUIPMENT. UNLESS SPECIFICALLY INDICATED OTHERWISE, INSTALL PIPING CONCEALED ABOVE CEILINGS, BENEATH THE FLOORS,

OR IN WALLS. ROUTE PIPING TO LINEAR BEAMS, COLUMNS, OBSTRUCTIONS AND THE WORK OF OTHER TRADES.

- 10. SLOPING, AIR VENTING, AND DRAINAGE:
- SLOPE PIPING AS INDICATED, TRUE TO LINE AND GRADE AND FREE OF TRAPS AND AIR POCKETS. UNLESS INDICATED OTHERWISE, SLOPE PIPING IN DIRECTION OF FLOW AS FOLLOWS: SERVICE INCLINATION SLOPE

₽" PER FOOT

HOT & COLD WATER PROVIDE AIR VENTS AT HIGH POINTS IN HEATING WATER PIPING.

CONDENSATE DRAIN

- 11. COPPER: CRIMPING OF COPPER TUBING IS PROHIBITED. ISOLATE COPPER PIPE AND TUBING FROM CONTACT WITH
- STEEL. FOR BRANCH DROPS AND RISES TO PLUMBING FIXTURES, ANCHOR BRANCH TO WASTE AND VENT PIPING. 12. PIPE ENDS: PERFORM PIPE CUTTING AND END PREPARATION SO AS TO RESULT IN CLEAN ENDS WITH FULL INSIDE DIAMETER. GRIND AND REAM AS NECESSARY.
- 13. THREADED JOINTS: APPLY TEFLON TAPE TO MALE THREADS.
- 14. WELDED JOINTS:
- WELDING OF PRESSURE PIPING SHALL BE DONE BY NCPWB QUALIFIED WELDERS. PERFORM WELDING PER
- WHERE REQUIRED, PEEN AND WHEEL-GRIND WELDS. ENDS OF PIPE MAY BE BURNED FOR WELDING, HOWEVER, GRIND-BEVEL AND REMOVE SCALE BEFORE WELDING JOINT. RAGGED EDGES WITH METAL BEADS, POOR ALIGNMENT, AND OTHER INFERIOR WORK WILL BE REJECTED.

APPLICABLE CODES, INCLUDING ASME BOILER CONSTRUCTION CODE AND ANSI CODE FOR PRESSURE PIPING.

- PERFORM WELDING WITH OXYACETYLENE OR ELECTRIC-ARC PROCESS.
- 15. SOLDERED JOINTS: CLEAN SURFACES TO BE JOINTED OF OIL, GREASE, RUST, AND OXIDES, CLEAN SOCKET OF AND BEFORE ASSEMBLY OR HEATING, APPLY FLUX TO JOINT SURFACE AND SPREAD EVENLY. CLEAN REFRIGERANT PIPING AS RECOMMENDED BY AIR CONDITIONING EQUIPMENT MANUFACTURER.
- 16. CAULKED CAST IRON BELL AND SPIGOT JOINTS:
- MAKE JOINTS WITH LEAD AND TARRED OAKUM. USE JOINT RUNNER SO THAT, AFTER POURING, LEAD WILL FINISH FLUSH WITH BELL. PROVIDE 1" MINIMUM DEPTH LEAD SEAL.
- MAKE JOINTS BETWEEN CAST IRON PIPE AND STEEL WITH FITTINGS MADE ESPECIALLY FOR THAT PURPOSE, SUCH AS TAPPED SPIGOTS, TUCKER CONNECTIONS, ETC..

- A. FABRICATE AND INSTALL DUCTWORK AND ACCESSORIES IN ACCORDANCE WITH THE CALCIFORNIA MECHANICAL CODE,
- AND SMANA & ASHRAE STANDARDS. B. SEISMICALLY SUPPORT AND BRACE ALL DUCTWORK PER SMACNA.
- FLEXIBLE DUCT SHALL BE INSTALLED WITHOUT KINKS AND SHARP BENDS THAT RESTRICT AIR FLOW. INSTALL AND SUPPORT PER CALIFORNIA MECHANICAL CODE. INSTALL TURNS WITH A MINIMUM OF 1.5 TIMES DIAMETER RADIUS. WHEN THER IS NO HEADROOM TO MAKE TURNS TO CONNECT TO THE DIFFUSERS, PROVIDE ACOUSTICALLY LINED PLENUMS AT THE AIR OUTLETS TO SIDE CONNECT THE FLEX. DUCT.
- COMPLY WITH THE INDOOR AIR QUALITY REQUIREMENTS DURING CONSTRUCTION, STORAGE OF MATERIALS AND POST CONSTRUCTION AS REQUIRED BY LEED-NC v2.2. KEEP THE DUCT OPENINGS COVERED DURING CONSTRUCTION TO PREVENT ENTRY OF CONSTRUCTION DUST AND DEBRIS.
- DUCTWORK SHALL BE FABRICATED AND SEALED TO MINIMIZE AIR LEAKAGE THROUGH SEAMS AND JOINTS AND CONNECTION TO THE EQUIPMENT AND OUTLETS TO A MAX. OF 6% OF THE TOTAL SYSTEM CAPACITY AT THE RATED
- UNLINED SUPPLY AND RETURN DUCTS SHALL BE INSULATED PER T-24 WITH DUCT WRAP INSULATION, MIN. R-6 WITH

ASJ VAPOR JACKET.

- 3.03 EQUIPMENT INSTALL EQUIPMENT PLUMB AND LEVEL. COORDINATE EQUIPMENT LOCATION AND SERVICE ACCESS WITH THE ARCHITECTURAL PLANS. PROVIDE ROOF CURBS, SUPPLEMENTAL SUPPORT FRAMING SEISMIC ANCHORAGE AND
- VIBRATION ISOLATION AS NECESSARY TO PROPERLY SUPPORT THE EQUIPMENT. COORDINATE WITH THE ROOFING CONTRACTOR FOR REQUIRED ROOFDECK OPENING FOR DUCTWORK, CURB
- ANCHORAGE TO STRUCTURE AND FLACHING. CEILING SUPPORTED EQUIPMENT SHALL BE SUPPORTED FROM HANGERS VIBRATION ISOLATORS AND SEISMIC CABLE BRACING. THE FORCES DUE TO GRAVITY SUPPORT AND SEISMIC FORCES TRANSMITTED TO THE BUILDING STRUCTURE SHALL NOT EXCEED THE MAXIMUM ALLOWABLE LIMITS SPECIFIED IN THE STRUCTURAL PLANS. FOR SUPPORTING FROM WOOD STRUCTURE PROVIDE PROPER TYPE OF SIMPSON SUPPORTS BRACKETS AND SUPPORTS.

- A. COMPLY WITH THE CITY OF LIVERMORE, CA REGULATIONS GREEN DESIGN AND MEET THE ALL THE PREREQUISTE AND OPTIONAL LEED POINT CHECKLIST SELECTED FOR THE PROJECT. REFER TO THE ATTACHED CHECK LIST FOR THE TARGETTED LEED CREDIT POINTS TITLED "LEED FOR NEW CONSTRUCTION v2.2 WORKSHEET FOR HCCC PHASE-1B BUILDING-C ADMINISTRATION BUILDING LOCATED AT 1200 ARROWHEAD AVENUE,
- C. THE DESIGN TEAM WILL SPECIFY AND/OR INDICATE THE REQUIREMENTS FOR THE DESIGN PHASE CREDITS. THE CONTRACTORS SHALL MEET THE REQUIREMENTS FOR THE CONSTRUCTION PHASE AND THE POST CONSTRUCTION PHASE REQUIREMENTS TO EARN THE TARGETTED LEED CREDIT POINTS. THE RESPECTIVE TRADE CONTRACTOR SHALL INCLUDE IN THE BID PRICE FOR INCLUDING ALL NECESSARY MATERIALS, RESOURCES, MAN-HOURS AND DOCUMENTATION NECESSARY TO COMPLY WITH EACH CREDIT POINTS PER THE USGBC GUIDELINES AND THE CITY OF LIVERMORE REQUIREMENTS.
- D. THE CONTRACTOR SHALL <u>NOT</u> USE MATERIALS AND RESOURCES THAT ARE KNOWN TO HAVE HARMFUL EFFECTS ON THE ENVIRONMENT AND THE OCCUPANTS AND THOSE THAT ARE PROHIBITED BY USGBC. NO EQUIPMENT OR SYSTEMS SHALL BE INSTALLED IN THE BUILDING WHICH USES CFC AND HCFC REFRIGERANTS FOR HEATING, COOLING & REFRIGERATION. ALL SEALANTS, ADHESIVES, FINISHES ETC. USED IN THE MANUFACTURED PRODUCTS, EQUIPMENT, MATERIALS OF CONSTRUCTION SHALL BE FREE OF FORMALDEHYDE AND OTHER BANNED VOCs.
- E. DURING CONSTRUCTION AND OCCUPANCY, CONTRACTOR SHALL IMPLEMENT THE USGBC REQUIREMENTS FOR THE "INDOOR AIR QUALITY MANAGEMENT PLAN" FOR EACH TRADE ALONG WITH SUBMITTING THE LEED LETTER TEMPLATES TO THE CITY FOR APPROVAL.
- F. EQUIPMENT EFFICIENCY: CONTRACTOR SHALL PROVIDE EQUIPMENT AND SYSTEMS THAT MEET OR EXCEED THE ENERGY EFFICIENCY SPECIFIED IN THE RESPECTIVE DIVISION SCOPE OF WORK AND AS REFLECTED IN THE TITLE-24 REPORT AND ACHIEVE THE TARGETED OVERALL BUILDING ENERGY SAVINGS BETTER THAN THE STANDARD T-TLE-24. PROVIDE ALL NECESSARY CONTROLS FOR THE HVAC, PLUMBING & LIGHTING PER THE T-24 AND THE RESPECTIVE LEED POINT CHECKLISTS.
- G. PROVIDE FUNDAMENTAL COMMISSIONING OF THE BUILDING ENERGY SYSTEMS, INCLUDING BUT NOT LIMITED TO - HVAC AND CONTROL SYSTEMS, OUTSIDE AIR DELIVERY, PLUMBING SYSTEMS, LIGHTING AND CONTROLS PER THE ASHRAE COMMISSIONING STANDARDS AND USGBC GUIDELINES PROVIDE NECESSARY MANPOWER TOOLS MATERIALS, EQUIPMENT, TECHNICAL SUPPORT AS NECESSARY TO CONDUCT THE COMMISSIONING. SUBMIT COMMISSIONING REPORT FOR EACH EQUIPMENT, ZONE,
- H. REFER TO OTHER REQUIREMENTS IN THE FOLLOWING AND INCLUDE WORK SCOPE
- 2. SECTION 01515 CONSTRUCTION WASTE MANAGEMENT.
- 4. LEED-NC v2.2 CHECKLIST FOR HCCC 1200 ARROWHEAD AVENUE, BUILDING-C. 5. DIVISION-15 & DIVISON 16 SPECIFICATION SECTIONS AND DRAWINGS.
- 6. ARCHITECTURAL, STRUCTURAL, CIVIL, STRUCTURAL PLANS AND SPECS.

- C. EAcP1 PREREQUISITE #1 FUNDAMENTAL COMMISSIONING OF THE BUILDING ENERGY SYSTEMS..

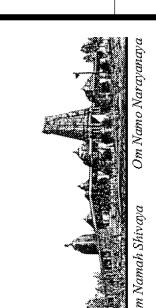
- F. EAc1 OPTIMIZE ENERGY PERFORMANCE. BUILDING ENERGY T-24 ENERGY USE SHALL BE
- G. F. EAC2 OPTIMIZE ENERGY PERFORMANCE. BUILDING ENERGY T-24 ENERGY USE SHALL
- H. EQcP1 MINIMUM IAQ PERFORMANCE

EQc1 - OUTDOOR AIR DELIVERY MONITORING

- J. EQc3.1 CONSTRUCTION IAQ MANAGEMENT PLAN DURING CONSTRUCTION.
- L. EQc4.1 LOW-EMITTING MATERIALS, ADHESIVES & SEALANTS.

USGBC-LEED NC v2.2 COMPLIANCE REQUIREMENTS

- B. THE SELECTED USGBC LEED CREDIT POINTS SHALL FOLLOW THE PROCEDURES AND CRITERIA ESTABLISHED BY USBGC AND SHALL INCLUDE THE DESIGN PHASE CREDITS, CONSTRUCTION PHASE CREDITS AND THE POST CONSTRUCTION PHASE CREDITS.
- WORK. NECESSARY INSPECTION, DOCUMENTATION AND REPORTING SHALL BE PROVIDED
- DEVICE, AND EACH SYSTEM.
- CONTAINED IN THESE DOCUMENTS AS IT RELATES TO WORK OF THIS DIVISION:
- 1. SECTION 01400 PROJECT SUSTAINABILITY REQUIREMENTS.
- 3. 01810 FUNDAMENTAL COMMISSIONING OF BUILDING ENERGY SYSTEMS.
- 2.00 THE MECHANICAL, PLUMBING & ELECTRICAL TRADE CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLYING WITH THE LEED REQUIREMENTS FOR THE FOLLOWING SELECTED CREDIT
- A. SSc8 LIGHT POLLUTION REUCTION.
- B. WEC3.1 AND WEc3.2 WATER USE REDUCTION.
- D. EAcP2 MINIMUM ENERGY PERFORMANCE E. EAcP3 - FUNDAMENTAL REFRIGERANT MANAGEMENT.
- BE 15.6% BELOW T-24 PER THE T-24 COMPLIANCE FORMS ATTACHED.
- K. EQc3.2 CONSTRUCTION IAQ MANAGEMENT PLAN BEFORE OCCUPANCY.
- M. EQc5 INDOOR CHEMICAL & POLLUTANT SOURCE CONTROL. N. EQc6.1 - CONTROLLABILITY OF SYSTEMS - LIGHTING.



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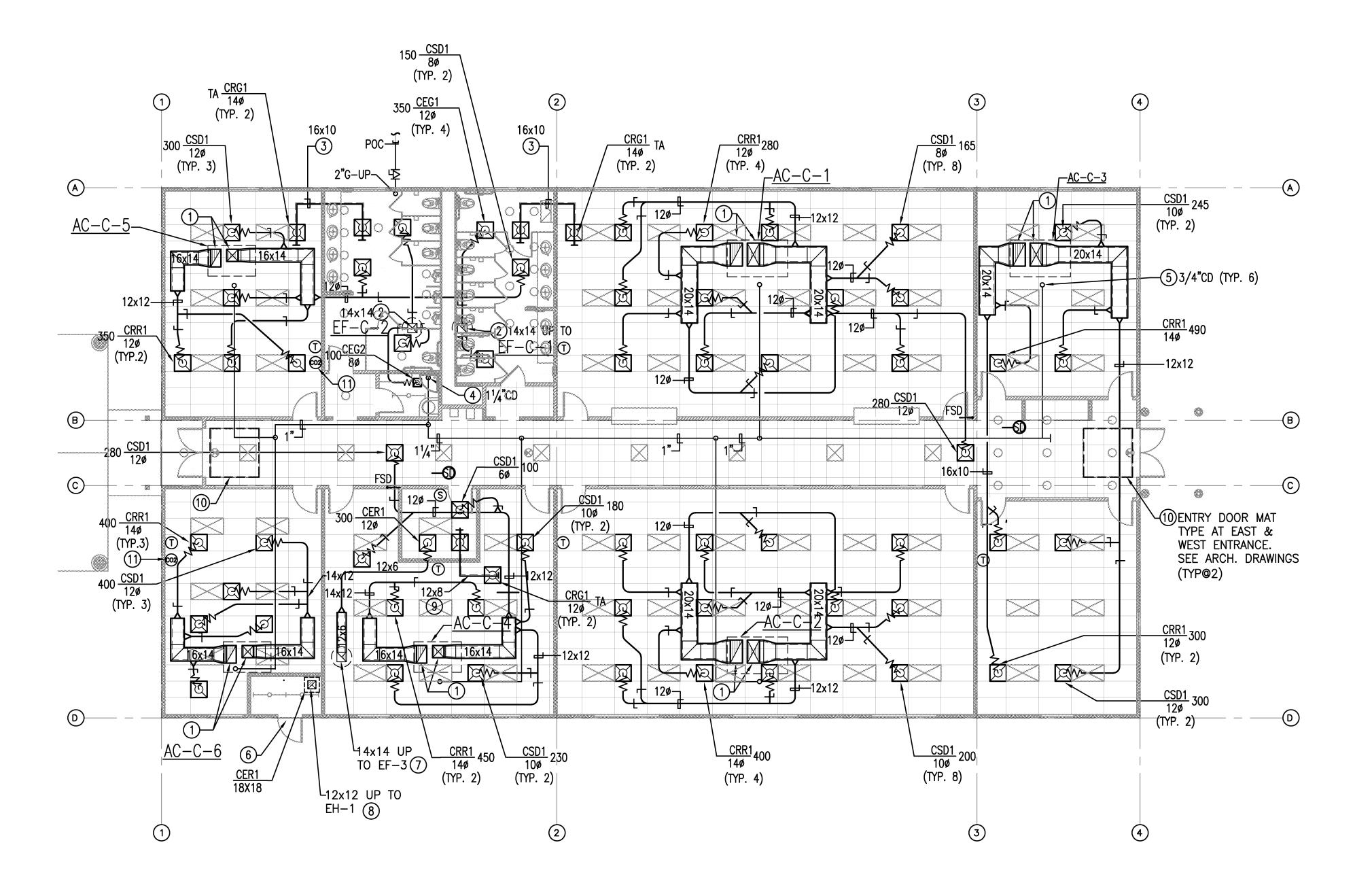
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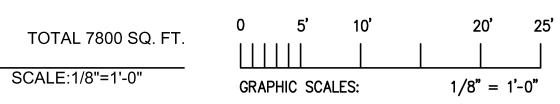
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05/28/10 AS NOTED DRAWN BY: PROJECT:

ARROWHEAD



BUILDING C - PHASE 1-B MECHANICAL PLAN



GENERAL NOTES

- A. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR THE CEILING HEIGHT AND STRUCTURAL CLERANCES AVAILABLE FOR ROUTING THE DUCTWORK. THE AVAILABLE CLEARANCE BETWEEN BOTTOM OF STRUCTURAL JOISTS AND FINISHED CEILING IS 18". COORDINATE WITH ALL TRADE WORK INCLUDING PLUMBING, FIRE PROTECTION AND ELECTRICAL AND MODIFY THE DUCT ROUTING TO AVOID CONFLICTS.
- B. THE MAXIMUM ALLOWABLE FLEXIBLE DUCT LENGTH SHALL BE 6 FEET. INSTALL PER CMC AND SMACNA REQUIREMENT.
- C. ALL SUPPLY, RETURN AND EXHAUST SHALL BE DUCTED. DUCTWORK SHALL BE SEALED & LEAKAGE TESTED PER CEC T-24 REQUIREMENTS AND CERTIFIED. SHEET METAL DUCTWORK SHALL BE FABRICATED AND INSTALLED PER CMC AND
- D. HVAC WORK SHALL BE IN COMPLIANCE WITH THE CURRENT CEC T-24 STANDARDS AND ALL APPLICABLE CALIFORNIA AND LOCAL CODES.
- E. PROVIDE VOLUME DAMPERS IN EACH BRANCH DUCTS FOR AIR BALANCING.
- F. PROVIDE TRANSFER AIR BOOT ABOVE CEILING AT ALL FULL-HEIGHT PARTITIONS.
- G. LOCATE DUCT DETECTOR WITHIN 5 FEET FROM FSD TO CLOSE THE DAMPER WHEN THE DETECTOR IS ACTIVATED. COORDINATION WIRING WITH DIVISION—16.
- H. PROVIDE FACTORY FURNISHED T-24 COMPLIANT ELECTRONIC PROGRAMMABLE ROOM THERMOSTATS FOR EACH AC UNITS AND PROGRAM THE THERMOSTATS DAILY START-STOP AND SETTING REQUIREMENTS PER THE OWNERS' BUILDING OCCUPANCY SCHEDULE. PROGRAM THE OFF-HOUR COOLING SET-UP AND HEATING SET-BACK SETTINGS PER TITLE-24. PROVIDE CO2 SENSORS FOR CONFERENCE ROOMS PER SHEET NOTE #11 BELOW.
- AIR BALANCE CONTRACTOR SHALL VERIFY THE CONTROL FUNCTIONS OF EACH AC UNITS AND VERIFY THE ECONOMIZER OPERATION AND OUTSIDE AIR CONTROL DAMPERS ARE FUNCTIONING PROPERLY. WHEN THE UNIT IS OFF, THE EXHAUST AIR DAMPER & OUTSDIE AIR CONTROL DAMPERS SHALL CLOSE. BALANCE OUTSIDE AIR TO EACH THERMOSTATIC ZONE TO THE AMOUNT INDICATED ON THE AC UNIT SCHEDULE AND SUBMIT TEST AND VERIFICATION REPORTS IN ACCORDANCE WITH T-24 REQUIREMENTS.
- COMPLY WITH REQUIREMENTS OF USGBC-LEED NC PER THE CHECKLIST FOR INDOOR ENVIRONMENTAL AIR QUALITY, VENTILATION, INSULATION, THERMAL COMFORT AND POST CONSTRUCTION COMMISSIONING AND PURGING. SUBMIT REPORTS FOR EACH TASK.
- K. FACTORY MADE U.L. LISTED CLASS-1 ACOUSTICAL FLEX DUCT LENGTH SHALL NOT EXCEED MAX OF 6 FEET IN LENGTH. USE FACTORY ATTACHED COLLARS AND T-24 APPROVED ADHESIVE MASTIC TAPES TO ATTACH THE FLEX DUCT TO DUCTWORK AND DIFFUSER. INSTALL PER CALIFORNIA MECHANICAL CODE WITHOUT KINKS.
- L. INSULATE ALL UNLINED SUPPLY AND RETURN DUCTS WITH MIN. R-8 DUCT WRAP INSULATION WITH VAPOR JACKET PER T-24 AND CMC REQUIREMENTS.
- M. FOR FSD INSTALLATION REFER TO DETAIL-1/M11.2B & PER MANUF. UL LISTING.

SHEET NOTES

- (1) SUPPLY AND RETURN AIR DUCTS WITH ACOUSTICAL LINING FROM ROOFTOP AC UNIT IN THE ROOF WITH ONE ELBOW AND MIN. 10 FEET OF DUCT PRIOR TO CONNECTING THE BRANCH DUCTWORK. COORDINATE THE LOCATION OF THE DUCT DROP AND AC UNIT ROOFTOP LOCATIONS WITH OTHER TRADES AND ADJUST ACCORDINGLY.
- 2 14x14 EXHAUST AIR DUCT UP TO TOILET EXHAUST FANS (EF-C-1 & EF-C-2) ON THE ROOF. SEE ROOF PLANS FOR CONTINUATION.
- (3) 14x10 TRANSFER AIR DUCT WITH ACOUSTICAL LINING. (TYPICAL OF 2).
- 4) TERMINATE 11/4" CONDENSATE DRAIN LINE OVER THE JANITOR'S SINK.
- (5) 3/4" CONDENSATE DRAIN LINE FROM ROOFTOP AC UNITS ON THE ROOF. TYPICAL OF 6. PROVIDE MINIMUM 1/8" PER FOOT SLOPE DOWN TO THE JANITOR; S SINK IN THE JANITOR ROOM. INSULATE ALL CONDENSATE LINES WITHIN THE CEILING SPACE.
- (6) SIGHT-PROOF 18x12 EXTERIOR GRADE DOOR LOUVER WITH INSECT SCREEN.
- 7 14x14 EXHAUST AIR DUCT UP TO EXHAUST FAN (EF-C-3) ON THE ROOF. PROVIDE WALL MOUNTED LOCAL EXHAUST SWITCH TO EXHAUST THE COPIER ROOM, WHEN IT IS IN USE.
- 8 12x12 EXHAUST AIR DUCT UP TO EXHAUST HOOD (EH-1) ON THE ROOF FOR GRAVITY EXHAUST ENTILATION. PROVIDE 18X18 EXHAUST GRILLE.
- 9 12x8 TRANSFER AIR DUCT WITH ACOUSTICAL LINING.
- 10 6'X6' DOOR ENTRY MAT TYP AT EAST AND WEST ENTRY DOORS. SEE ARCH. DRAWINGS FOR DETAILS.
- (1) PROVIDE WAL-MOUNTED CARBON DIOXIDE (CO2) SENSORS COMPATIBLE WITH THE ROOFTOP AC UNIT CONTROLLER FOR AC UNITS AC-C-5 & AC-C-6. WHEN THE CO2 LEVEL IN THE CONFERENCE ROOM EXCEED 800 PPM (ADJUSTABLE) IT SHALL SEND A SIGNAL TO THE AC UNIT CONTROLLER TO MODULATE OPEN THE OUTSIDE AIT AND EXHAUST AIR DAMPERS PROPORTIONALLY TO INCREASE AMOUNT OF OUTSIDE AIR TO THE SPACE. UPON A DROP IN THE CO2 LEVELS BELOW THE PRESET 800 PPM, THE OSA AND EA CONTROL DAMPERS SHALL MODULATE BACK TO THE NORMAL (MINIMUM) MODE OF OPERATION.

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I D D D MECHANICAL BUILDING (PHASE 1-E

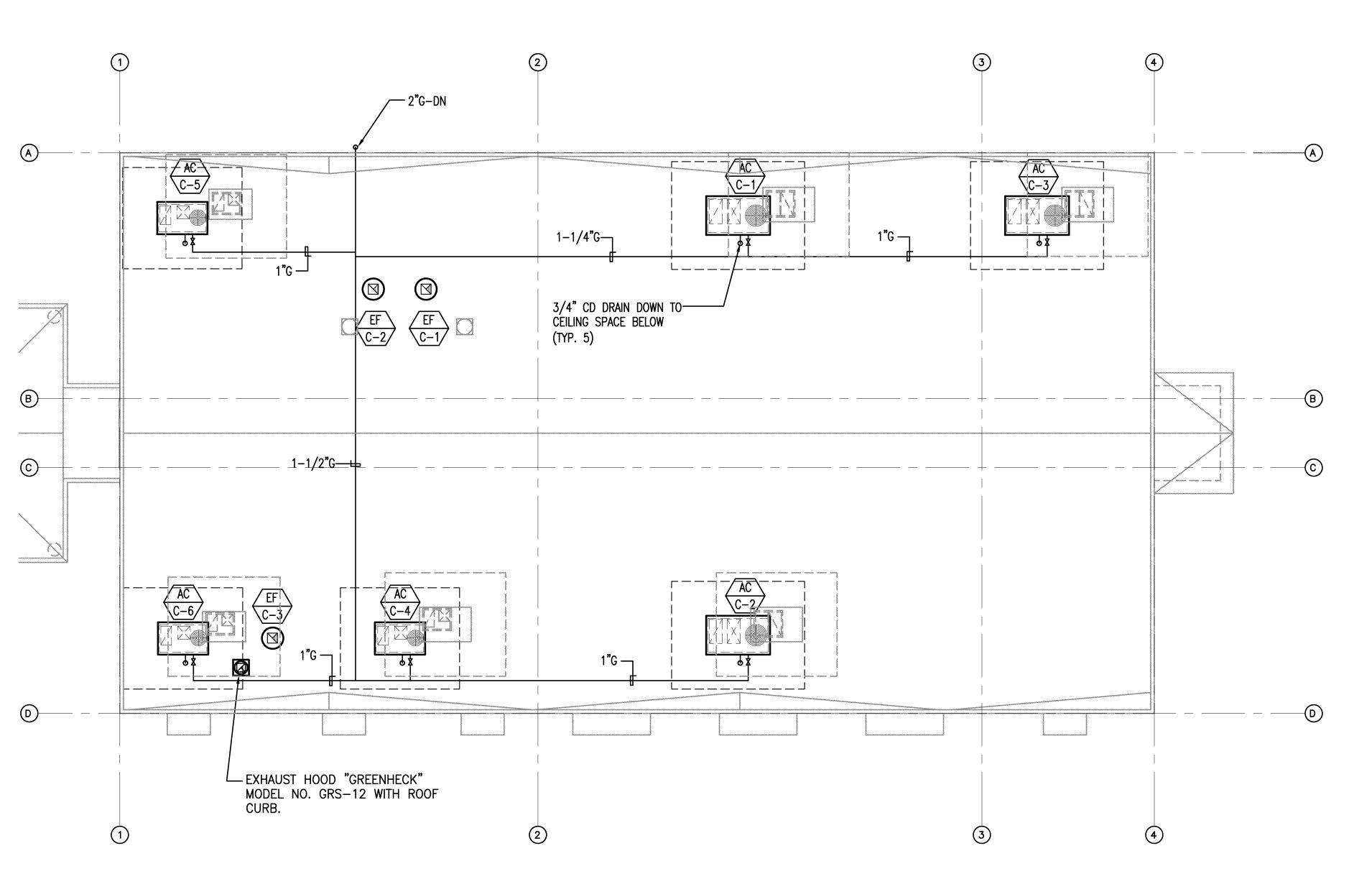
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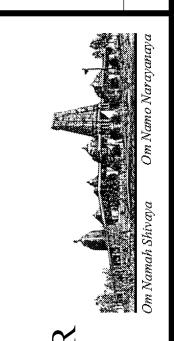
ARROWHEAD



GENERAL NOTES

- A. ALL INSTALLATIONS SHALL COMPLY WITH ALL APPLICABLE CALIFORNIA AND LOCAL CODES.
- B. ALL NEW WORK SHALL COMPLY WITH CURRENT 2007 CMC AND SMACNA DUCT CONSTRUCTION STANDARDS.
- C. INSULATE SUPPLY & RETURN DUCTS PER TITLE 24 REQUIREMENTS.
- D. MAINTAIN SERVICE CLEARANCE ALL AROUND THE EQUIPMENTS.
- E. SEISMICALLY ANCHOR ALL EQUIPMENTS TO THE STRUCTURES PER BUILDING CODE. COORDINATE WITH STRUTURAL ENGINEER FOR FRAMING AND BLOCKING FOR EQUIPMENT ANCHORAGE.
- F. PROVIDE GALVANIZED PIPING & FITTINGS FOR EXPOSED GAS PIPING ON ROOF. PROVIDE GAS COCK, DIRT LEG, LISTED GAS CONNECTORS RATED FOR OUTDOOR APPLICATION AT CONNECTIONS TO EACH AC UNIT.
- G. PROVIDE TRAPPED CONDENSATE DRAIN FROM THE AC UNIT AND TERMINATE TO THE SERVICE SINK IN JANITOR CLOSET. INSTALL CONDENSATE COLLECTOR DRAIN PIPING WITH MINIMUM 2% SLOPE.
- H. SUPPORT ROOFTOP GAS AND CONDENSATE PIPING AND CONDUITS WITH B-LINE "DURA-BLOCK" DB SERIES SUPPORT BLOCKS ANCHORED TO ROOF. USE DURA-BLOCK "BVT" SERIES INSULATED PIPE CLAMPS (TYP). PROVIDE SLEEPER SUPPORTS AT MAX 6 FT ON CENTERS OR AS REQUIRED TO PREVENT PIPE SAGGING AND TO DRAIN THE CONDENSATE TOWARDS THE JANITOR SINK. MAINTAIN 2% SLOPE ON ROOF FOR CONDENSATE DRAIN PIPE.

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NEW BUILDING "C" - PHASE 1B
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1ECHANICAL ROOF PLAN BUILDING C

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05/28/10
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